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## REPRESENTING

THE AMERICAN GYNECOLOGICAL SOCIETY

THE AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS  
THE OBSTETRICAL SOCIETIES OF NEW YORK, PHILADELPHIA, BROOKLYN

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VOLUME I

OCTOBER, 1920—JUNE, 1921

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# The American Journal of Obstetrics and Gynecology

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VOL. I.

ST. LOUIS, OCTOBER, 1920

NO. 1

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## Announcement

THE editors and publishers have the honor to present the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY to the medical profession for its approval.

The importance of obstetrics and gynecology as an integral part of medical art and science should be measured not only by its interest to those directly engaged in it as a specialty but likewise to those who practice medicine in a more general sense. A topic that necessarily commands the attention of so many physicians must be adequately represented in journal literature and demands a medium of publication primarily devoted to its advancement and welfare. The present venture has been developed in response to this need.

The new AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY will be conducted by the profession, for the profession, and in order that the latter may be definitely represented in its management, the general conduct of the enterprise is vested in an advisory board, the membership of which serves as a guarantee that the interests of the profession will be adequately protected and assured.

The policy of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY will be liberal in the sense of service to the specialist in this field, as well as the general practitioner. The clinician, the pathologist, the research worker, and the sociologist are all welcome to express their thoughts in its pages, which we trust will serve as an effective medium of exchange for the many whose united efforts contribute to make obstetrics and gynecology one of the essential branches of medicine.

In addition to original communications and records of special society transactions, a feature in the new journal will be made of the department devoted to current medical literature. This important department will be conducted by the Associate Editor, Dr. Hugo Ehrenfest, who will present recent progress and research in this field in the form of carefully prepared reviews and criticisms. We believe that this arrangement will be of great value to our readers.

The editors and publishers respectfully submit the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY to the American medical profession, fully realizing the trust imposed upon them and hoping for an endorsement of the attempt to serve its interests.

## Original Communications

### A PROGRAM FOR AMERICAN GYNECOLOGY PRESIDENTIAL ADDRESS AMERICAN GYNECOLOGICAL SOCIETY\*

BY ROBERT L. DICKINSON, M.D., F.A.C.S., NEW YORK, N. Y.

OPPORTUNE and insistent, in these days of analysis and readjustment, there stand out, in our Constitution and in our motto, two special phrases. "The object of this Society," says the former, "shall be the promotion of knowledge in all that relates to the Diseases of Women, to Obstetrics and to Abdominal Surgery." Our motto may be rendered: "Like the stars, each revolves, without haste, without rest, round his own particular task." "All that relates," says one; "his own task," says the other.

#### SURVEY

In earlier years the urgency that was inherent in certain parts of the work put off the balanced promotion of the whole, and it was also inevitable that tangents should be struck off from our own orbit. But now it is meet and right, as several authors in the past year have urged, that we diligently examine ourselves whether our own omissions have had anything to do with such situations as an untouched obstetric mortality and morbidity and the threat of eclipse of the gynecologic guild. Surgery we promoted. But if we be just surgeons, by surgeons we may be displaced. Diagnosis we developed and principles we have taught, till all may follow—and supplant. The point is come where old fields must give new crops and new lands be opened up or our claims surrendered. The war searched out most of the barren spots in medicine, and the geography of the spots. In that search the Council of Defense and then the Army, sifted the men and the methods of every specialty save one. Our group-work, useless to war, escaped ordered scrutiny, and now, after the war, presents the anomaly of being without an inventory and lacking in data on which to construct a plan for intensive culture. Some material is provided, of course, in the studies of standards in colleges and hospitals made by the American Medical Association, the American College of Surgeons, and the Carnegie investigations. Further studies into the various departments of medicine are imminent. It is for us to decide whether we shall lead or be led in such surveys. Now, we see, as in a speculum, darkly. It is for us to say how we wish to be seen in the future.

\*Read at the Forty-Fifth Annual Meeting of The American Gynecological Society, Chicago, May 24-26, 1920.

NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."



## EXTENT OF THE FIELD

There are reasons why our specialty should readily lend itself to this scrutiny. It presents the paradox of being limited, yet large. The total list of disabilities is brief compared with general surgery—the actual incidence is surprisingly large. Gynecologic operative procedures comprise one-fourth of the surgery of sorts. The figures on which the above statement was made have been derived from a careful review of notices of operation issued daily by our Clinical Congresses and by the Society for the Advancement of Clinical Study of New York.

One fourth of surgery. Yet this does not indicate the extent of the field, since operation is needed by less than one tenth of the patients that come to the doctor for ailments peculiar to women (childbearing not included). Even this last figure will alter greatly, though lowering the operative percentage when thorough routine preventive examinations shall prevail. Thus, whether for sheer bulk, or for need of skill of scalpel, or for setting a pace for humane handling of the human personality, our field may claim to be without parallel in opportunity.

## NEW WORK

In searching for the gaps in the promotion of knowledge in our task, the questions naturally arise: Are there problems which the man in our line is alone qualified to solve? Are there studies or pronouncements that such a society as this is particularly equipped to undertake? An affirmative answer would include such subjects as the following paragraphs take up, though one cannot presume to make more than a sketch of the whole area.

## NOMENCLATURE

A standard nomenclature should be a matter of agreement on the part of authoritative organizations. At present we find ourselves unable to place in parallel columns the results of writers and institutions in general. A new start has been made. All the great groups involved were invited to unite in action and to come together on one list centering in a government office. The Census Bureau has just issued such a volume. It is evidence that the Bureau no longer confines its interests to the defunct. This "Standard Nomenclature of Diseases and Pathological Conditions, Injuries and Poisonings for the United States" is submitted to you by your president, the chairman of the original committee. It is submitted for criticism and suggestion as a first step—and a first step only—toward ultimate agreement, in the hope that we will amend this edition and care to keep an active representative on the main committee. The hearty coöperation and representation of the Army, the Navy, and the Public Health Service, the various national medical organizations, the large insurance companies, and all factors having to do with vital statistics make this volume representative as no previous attempt in any language has ever been representative.

## OPERATION NOMENCLATURE

To supplement and complete this action there should be produced an acceptable list of operative procedures. Your presiding officer submitted to some

of you several years ago such a working list. He is glad to find a member noted for thoroughness newly laboring on this set of terms. Without this standard no two operators can be sure they are comparing the same processes, the variant use of the words "total hysterectomy" being an instance in point.

#### DEFINITIONS

While we are delimiting terms there are not a few that appear in every hospital report that make for confusion, for which exact bounds could be set. Among these are the words "major" and "minor" as applied to operations. We might even find or invent a name for a member of our double or bracketed specialty. We might define the qualifications for membership in this Society. Such a statement of a standard does not exist.

#### STANDARDS

This Society might take upon itself to establish certain standards in obstetrics and gynecology. Just what is meant by "standards?" I take it to be the best present practice, widely studied, fairly epitomized, succinctly written down, warily applied. Though concrete, it is not set like cement, as some assume. Rather does it alter as it alteration finds, rising to meet each step of well attested progress, sanely adapting its content to each special group of conditions, but never falling below a reasonably high requirement. Says Dr. George E. Vincent of the Rockefeller Foundation, "It is well to recognize the relativity of ideals. In human institutions there are no absolute standards." He goes on to give the warning that while the highest ideals may be approximated in a few institutions it "would be a serious mistake not to recognize various degrees of achievement." "All that can be confidently claimed is that some \* \* \* fall far below any standard that can be recognized as guaranteeing results which will safeguard the public and protect the profession." "There is danger that the existence of a standard may force a formal rather than a real compliance with ideals," and "a premature effort to conform to a standard may do actual harm." However, this may be—and it applies equally to detail of everyday procedure as well as to great issues—there can only be profit in presenting ideals. This, as the College of Surgeons shows us, is found in actual practice to be the essential step, and in most cases all that is needed. The competitive instinct does the rest. If we, for instance, were to place side by side the product and practice of a certain finely equipped northern clinic and that of one small southern service that steadily breeds teachers, our Society would be fulfilling its function of promoting knowledge concerning obstetrics—in the minds of one set of trustees. The publication of the average necessity for Cesarean compared with its frequency in one of our clinics had only to be stated to bring strong condemnation. The Society can get publicity where individuals could not. We can report on ourselves, and on our own communities. As Henry S. Pritchett said in the last Carnegie report on teaching, "There could be no more wholesome contribution to education than to ask our universities to take stock of themselves. No process could be more helpful than to ask the governing bodies



of these institutions to render a sincere and critical statement of the results obtained in the last 25 years." We may well do this for our department. And we may do another service in this line that would initiate a most wholesome contribution to surgery. This service would consist in taking stock of unnecessary operating. Such stock-taking should begin with our own clinics, for the least excusable of unnecessary suffering is that on women—and particularly on mothers of young children.

#### AXIOMS

Even though for the present any general acceptance of certain items of betterment in practice may seem unlikely, forward progress should initiate with us and not be imposed upon us by the demand of public opinion. Advocacy of axioms like the following cannot fail to bring about greater confidence in the profession on the part of the laity: "Except in emergency, no operation without consultation, medical and surgical." The chief will himself set the example, and see to it that the conferences will not be merely perfunctory.

"The findings at consultation set down in writing."

"Every patient discharged after operation to be provided with a written statement of the postoperative diagnosis and the operative measures."

"A patient (of office, hospital or sanitarium) is not getting fair or full value for her fee who does not receive a statement in writing—a diagnosis when provisionally or definitely made—a summary of treatment found to be successful or to fail."

"No woman may be examined unclothed or have a pelvic examination made (except in emergency) without the presence of a third person."

#### SOCIOLOGY AND GYNECOLOGY

The Society's interest in sociologic problems, to judge from recent volumes of the Transactions, does not evince itself to the extent of half a dozen papers in a dozen years. These are of a limited range, dealing chiefly with venereal diseases and prenatal care. Henry Newman drew our attention to the need of action last year. Our final act was to empower the Council to promote this movement. This promotion should be by action rather than words. Tonight we begin, by getting advice from authorities on the subject. Geddes, physician and ambassador, deplored the fact that doctors in general lack the spirit of citizenship. Otto Geier, prophet of industrial medicine, has drawn attention to the absence of medical men on the recent great commissions. We, a hundred and fifty thousand of us, men learned and otherwise, have scarce a representative in Congress. Except for work among ex-soldiers, our Federal Health Service is starved; our feeble attempts to obtain a Cabinet officer fruitless. France, in her recent election, placed forty-one doctors in her legislative branch, which equalled the quota of the agriculturalists and nearly that of the industrials. England has won her Ministry of Health. We are beginning, when Iowa really assumes the burden of illness and cuts the corners to do it, and when Wisconsin is spreading clinical instruction through-

out the state. Midwifery can claim to have made a fair start, as we shall hear tonight. What gynecology should undertake in the way of preventive work we shall hope to hear from the author of the new textbook on industrial hygiene, Colonel Mock, whom many of you will remember as one of the most effective men on the Surgeon General's staff during the war.

From among the strictly technical social problems that are in our hands, a few instances may be given. Is there a simple method of preventing propagation among women who are idiots, epileptic, hopelessly insane, or incurably criminal? Does the cautery-tipped sound produce an effective stricture, passed into the uterus to the tubal opening? Is Cary's new test safe and sufficient, wherein, with the patient in the knee-chest posture, sterile fluid injected into the cavity of the uterus disappears if the tube is patent and not otherwise?

At the opposite pole from sterilization, with its enormous potentialities of betterment of the race, is artificial impregnation. It is a field almost unstudied. Dublin proposes to open the abdomen after a few months of sterile married life, and Boston and Brooklyn do so without trial of this simpler means. This procedure is an excellent instance of the need of collective experimentation, since no one man is likely to have a large experience.

Another of the distasteful subjects we naturally shirk is contraception. What serious study has ever been made bearing upon the harm or harmlessness of the variety of procedures, or concerning the failure or effectiveness of each? Who has or can acquire any considerable body of evidence on these matters but ourselves? What, indeed, is normal sex life? What constitutes excess or what is the penalty for repression in the married? Do we still have to hark back to Luther for an answer? It will take a few professional lifetimes of accredited histories to gather evidence to submit, but some time a start must be made.

#### SIMPLER LIVING

What about standards of living? There was a man named Tarnier, honored beyond most men in our craft. He lived and saw his patients in a modest apartment up three flights of stairs. There were a host of men of a nation whose chief genius gave the Society its motto, a nation possessing beyond others the infinite capacity for taking pains, and these teachers and students of the modest life put us to shame by their scientific product. In our land the doctor must be a failure who has not a car and clothes as good, and house and habits of the class of his best patients. Sessions for pure science must be housed in palatial hotels. A whole house for a doctor with offices busy for one work-hour in four is the custom in most of our towns. This is a formula which any business would condemn. Little wonder that the pace is such there is scant time for study or clinical travel. The younger man cannot voice the protest. It is for us of the senior group to voice—and act out—a protest against over-weening costs of practice. There could hardly be a greater dis-service to science than to appear to give sanction to the dollar-gauge on achievement.

## GYNECOLOGIC CENTERS

What should one do with a collection of charts and slides and models accumulated through nearly forty years? A college needs only teaching outfit; that is, a relatively small amount of carefully selected illustrative material. Books are welcome to the medical libraries, which wisely distribute them. So also with the great copperplate editions. But the fine original drawings that publishers of medical magazines and books accumulate, are in time destroyed. Many of them are masterpieces of technic. In the home of the College of Surgeons here in Chicago or in the museums which Washington, Boston and Philadelphia possess, the casts and specimens may be taken. But the libraries and museums have not sensed the need or else have not the room for a slide library or a chart-and-drawing collection. Think what a saving it would be if you or I, in expounding our epoch-making discoveries, could get, as introductions to our subject, all the best standard pictures for the asking. Furthermore, in each large city there should be a studio attachment of a simple kind to library or museum where the medical author and his artist can work.

## SEX INSTRUCTION

Parts of sex instruction belong to us, and we may well be chief counselors in the determination of the details of this curriculum. The subject comes forward this evening, but I may here merely say that I do not see how the man in our line can escape the responsibility for imparting certain portions of this teaching himself, or else seeing to it that the family doctor or visiting nurse undertakes these. To the mother, in order to forestall the gonorrheal vulvitis of infants, book teaching without demonstration is insufficient. This also applies to the prevention of vulvar irritation and watchfulness lest the normal degree of autoeroticism go beyond bounds. To the young man and young woman, separately, a few days before marriage, who shall speak, and cover by instruction and warning those things concerning which our patients make this bitter and merited reproach, "Why did not someone tell us in time?"

Furthermore, an authoritative pronouncement is overdue bearing on the necessity of certain routine pelvic examinations. Concerning the prevention and early detection of cancer by this means, we are actively educating the profession. We may advocate, not only routine pelvic examination before marriage, but a physician's certificate, and in time will require that the certifier have specific qualifications to have his paper honored. The premarital test can include fitness for maternity. Next would come routine prevention care by examination of one's patients in the second month of pregnancy to forestall a large number of needless miscarriages. Before admission to certain forms of heavy work certificates based on examinations will one day be an accepted practice. All these are samples of gynecology at work in prevention instead of patching. We should be the counsellors to whom social workers turn, but we need to take thought in order to get ready with the answers.



## JOURNAL

As an example of the type of concrete and visible activity on the part of the Society, there may be instanced the initiation and responsibility for the editorial conduct of a technical journal. With a just proportion of the members of the editorial board named by this Society, its standing is sure to be high, and free from detrimental influence.

## TEXTBOOK

As the Society may wisely have under its auspices a periodical, so it may foster the publication in book form, of approved principles and practice and the necessary basic facts on which these are built, provided an adequate textbook is not produced or producible under the ordinary conditions of free competition. The Army set us the example. It is held by Holden that a satisfactory student's manual, containing all that it is desirable to teach him, should be very fully illustrated and have many cuts in color. Such expenditure is declined by publishers because the sale may not extend far beyond the writer's own classes. A manual brought out and approved by several prominent teachers and known to have the endorsement of the Society will be remunerative, even though kept up to date.

## CERTIFICATION OF SPECIALISTS

This Society in its yearly meetings is the great clearing house for ideas and the greatest annual stimulus most of us get withal. But if it is the desire of the membership to exert upon the practice of gynecology and obstetrics the widest possible influence, it will start now to lead in that certification of specialists which is bound to come. Our survey will demonstrate which institutions have outfit and output of such high grade that their graduates may be endorsed. Our standards will automatically test and our publicity of end results scale their workers, and though we err often in method or man, it is surely only by trial and open mindedness that we can effect any progress.

Such certification should have its time limit, and be renewable, let us say, every ten years. Even membership in this Society might be predicated on worthiness, not past, but present, with proof forthcoming every decade. What evidence has the State that my degree of thirty-eight years ago still keeps me fit in character and knowledge to practice medicine?

## WOMEN IN OBSTETRICS AND GYNECOLOGY

"Men and their trades unions," says Macassey, "have always been singularly successful in staking out their claims to the most highly remunerative classes of work, around which they have erected impenetrable barriers against the entry of women." Though we older doctors have seen our hospital wards humanized by the exaltation of the woman nurse and giving her control, we have refused to give her any real opening to qualify for the inside of the barrier by declining free access to internships and to assistant and associate positions. The limited exception is to be found in England,

where in Euston Road and the Royal Free Hospital for Women, Mrs. Scharlieb and her followers have made good in major work and, in the latter, alongside of men. If American women in their own medical colleges have suffered the inevitable consequences of inbreeding, the responsibility is with the men. "British women in industry," to quote Macassey again, "seemed temperamentally immune to the deadening influence of monotonous work, to which men are peculiarly susceptible. Paradoxically enough, when the work required constant alertness, a sure deft touch, delicacy of manipulation, in short, a combination of quick intelligence and manual dexterity, within a limited ambit, women were invariably superior to men." One would think Sir Lindley was describing qualifications for laboratory service, for dispensary or office treatment, for most of our operative technical craftsmanship. If his statement were applicable to American women, what a field for skilled associates, leaving us lords of reaction free for unlimited ambits. And what a chance to secure, for people recommended for operation, constant consideration as human beings. Think of tight lipped surgery with a tender heart.

By the way, are there no women who of right should be members of this Society?

#### TRAINING OF LEADERS

The shortage, commented upon last year, of men in our line who are of the caliber to head large services and to fill important teaching positions of the first and second ranks, is merely a striking instance of a condition that is general. The war mercilessly exposed the relative smallness of the number of men of the highest grade of ability in the profession. That it did the same for every other profession and business is scant comfort or excuse. The important thing to note is that some of the reasons are removable. Thus, as an example, only one surgeon in four of the fulltime surgeons in the Army reported himself as having a hospital appointment, and among the physicians only one in twenty-eight (28) had any hospital connection. This 14,000 first admitted to the army from civil practice ought to represent a cross section of the men in active practice in the profession (125,000). It should err on the favorable side, as there were 28 per cent rejections. After acceptance, the fulltime surgeons were grouped into classes. The grouping was based on first hand knowledge. Class A comprised men of the capacity of chiefs of large city clinics, able organizers and instructors; Class B, first assistants capable of assuming the chief's duties. Among the 14,000 there were as follows: Fulltime surgeons (self reported) 2884, or 20.7 per cent; fulltime surgeons (self reported) with hospital appointment 4.88 per cent; Class A surgeons 1.44 per cent; Class B surgeons 2.16 per cent; medical men with hospital connection 2.11 per cent.

This paucity of numbers to draw from must be remedied. This lack of leadership material must be met by developing to the utmost what training facilities we have until new resources take form. It cannot be a matter of indifference to this Society, therefore, and is a matter of no little concern to all workers in this department, to make sure that America's well-equipped teaching clinics are ably manned and working to full capacity at the job of

selecting and drilling the future teachers and investigators in gynecology and obstetrics. Our survey will demonstrate the facts. Publicity will do the rest.

#### PROGRAM

Here is a dream of a four year program for the Society, carrying out some of the visions of these wandering conceits. To be realized, they need but men and money and the driving force of an idea. Also flexibility.

First year: New journal under the auspices of the Society. Propositions for and action on those standards immediately required, such as details of the business of a typical hospital meeting for the weekly or monthly staff review of casualties. Self report by chief clinics, and on large cities. Report on participation in sociologic program. Tentative nomenclature of operations.

Second year: Report on colleges and obstetric-gynecologic services in general. Report on women in gynecology and obstetrics. Index of obstetricians and gynecologists looking toward certification. Standard methods, histories, indexes submitted for criticism or endorsement. Student's manual. Nomenclature of diseases and injuries and operations. Participation in public health movements affecting women, with recommendations based on these.

Third year: Publication of surveys and standards. Publication of best type of each form of service, private and outpatient, large and small; hospital, big and little. Plan for education of general practitioners at their home towns in everyday gynecology. Yearly paper on social or industrial subjects.

Fourth year: Certification of specialists.

To me this seems an inspiring program, and with it, whether carried on by us as individuals or by the Society, whether driven swiftly or slowly, the security of our future would seem to be assured.

438 WEST ONE HUNDRED AND SIXTEENTH STREET.



# A DEMONSTRATION OF CERTAIN TRANSITION STAGES FROM BENIGN TO MALIGNANT CONDITIONS IN THE OVARY, THE UTERUS, AND THE VULVA\*

BY T. WATTS EDEN, M.D., F.R.C.P., F.R.C.S. AND

GORDEN LEY, F.R.C.S., LONDON, ENGLAND

IT has been recognized for a long time that there is no sharp histologic line of demarcation between benign and malignant tissues: many neoplasms occur which histologists regard as suspicious, but not definitely malignant: many others are on the borderline. Some observers would designate them as benign, others as malignant.

The early clinical diagnosis of cancer is of overwhelming importance. Yet early diagnosis is very difficult, because the early stages of cancer are so often unattended by symptoms, or attended only by unimportant symptoms.

These difficulties have led observers to endeavor to define conditions which, while not definitely malignant, yet show such a tendency to end in malignancy that they may be regarded as half-way houses; such conditions if they can be detected, would be rightly called "precancerous."

This demonstration, as illustrated in the accompanying figures, is the outcome of an attempt to explore the intermediate conditions as they occur in the ovary, the uterus, and the vulva, and if possible to bring them in relation with recognizable clinical appearances. The positive results are perhaps meagre, but the subject is not an easy one, and much further work is required.

## OVARY

There is no evidence that ovarian cancer begins in normal follicles, we can only trace its origin from the epithelium of cysts. Therefore the cyst is the first departure from the normal, the first step along the path which eventually may lead to cancer.

*Pseudomucinous Cysts.*—Let us consider first these common, and quite benign growths. Their original structure in the character of their epithelium is shown in Fig. 1. The loculi are simple, i. e., they show no ingrowths, the mode of proliferation of these cysts being of the exogenous or everting type. The single layer of the epithelium is furnished with uniformly small, round basal nuclei.

Fig. 2, from an undoubtedly benign cyst, shows loculi with budding of villous processes growing into the interior (endogenous or inverting form of proliferation). This gives the loculi a more complex character than in Fig. 1. Further the epithelium is proliferating, the nuclei are irregular in size, are irregularly placed in the cells, and tend to become central instead of basal in position.

\*Presented by invitation at the Forty-fifth Annual Meeting of the American Gynecological Society, Chicago, May 25, 1920.

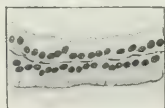


Fig. 1.—Section of pseudomucinous cyst of ovary ( $\times 92$ ) showing general structure (above), and character of epithelium (below) ( $\times 334$ ).

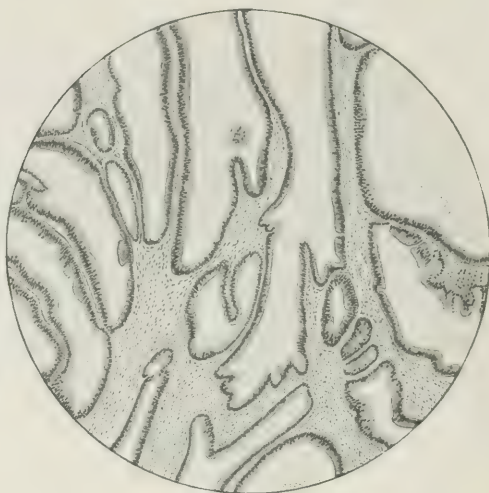


Fig. 2.—Section of benign ovarian cyst ( $\times 92$ ) showing endogenous or inverting form of proliferation. Character of epithelium with irregular nuclei (below) ( $\times 334$ ).

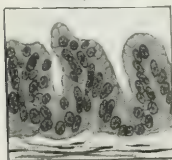


Fig. 3.—Section of ovarian cyst ( $\times 92$ ) clinically benign, showing villous formation of epithelium, tending to fill up the spaces.



Fig. 4.—Section of undoubted malignant ovarian neoplasm showing practically solid character with loculi disappearing ( $\times 92$ ).

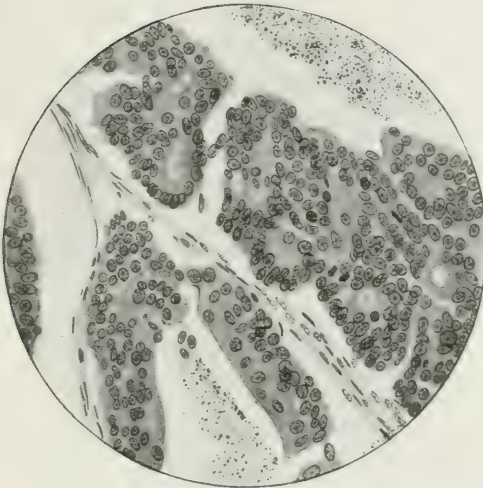


Fig. 5.—Epithelium from section shown in Fig 4 under high power (x 334).

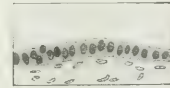
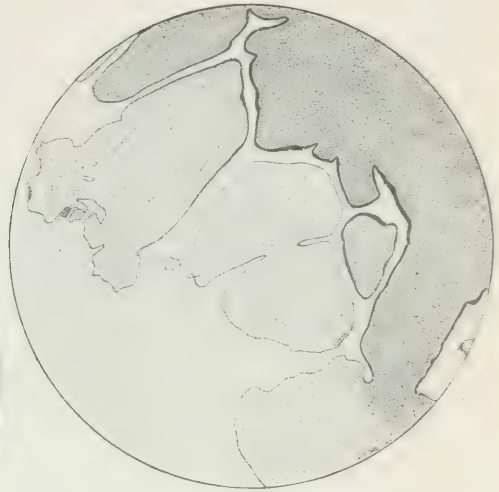


Fig. 6.—Section of ovarian cyst showing club-shaped intracystic papillae (x 30). Cubical epithelium below (x 334).



Fig. 7.—Low power section of ovary, showing papillary cysts in hilum.

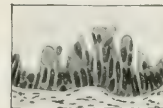


Fig. 8.—High power section through papillary mass of Fig. 7. Below is shown epithelium (x 334).



Fig. 3 is from a cyst which was clinically benign. The epithelium of the loculi shows abundant irregular, branching villous formations which tend to fill up the spaces. The epithelium shows imperfect cell definition, the outlines of the cell being difficult to trace, the nuclei are quite irregular in size and distribution. That rapid proliferation is occurring is shown by the accumulation of debris from detached cells in the center of the luculus. The stroma is normal and abundant and the outlines of the spaces are well defined.

In Figs. 4 and 5 we have an undoubtedly malignant growth; practically solid in general character. The regular locular formation has disappeared, but some irregular nuclei are still seen; the amount of stroma is scanty; the epithelium is a mass of solid, tubular, and papillary formations. These masses are multinucleated and vacuolated like plasmodium and they show no true cell divisions. There is much cellular debris in such spaces as remain. Fig. 5 shows the epithelium from the same tumor under a high power.



Fig. 9.—Section from an ovarian papillary carcinoma (x 92).

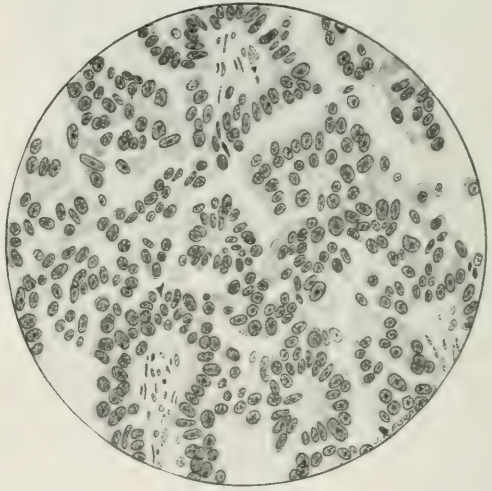


Fig. 10.—High power section of Fig. 9, showing scanty stroma.

*Papilliferous Cysts.*—The question whether these cysts really arise in Wolfian relics or in derivatives of the germ epithelium is immaterial for the present purpose.

Fig. 6, from a cyst of the ovary, shows the formation of solid club-shaped intra-cystic processes or papillae, having a well-formed fibrous tissue matrix. The epithelium is a single columnar or cubical layer, closely resembling that seen in the last section. The stroma of many of the papillae is edematous.

Fig. 7 is a low-power section through an ovary showing small papillary cysts in the hilum, which are nearly filled up with abundant compound dendritic papillae.

Fig. 8 shows a section under a high power through one of the papillary masses. The stroma is abundant and healthy. The epithelium shows great activity; there are many club-shaped and irregular, epithelial processes, due to sporadic proliferation. The cell-layer is irregularly multiple, and the nuclei are irregular in size, shape, and distribution.

Fig. 9 is from a postmortem specimen of a case which was undoubtedly a papillary cancer. The stroma is scanty, the papillar arrangement is preserved, but has become quite irregular. The papillæ are covered with many layers of cells cubical and polygonal in shape, and of a variable size, the nuclei irregular in size, shape, and distribution.



Fig. 11.—Section through lip of cervix showing erosion. (From Eden and Lockyer, *Gynecology*.)

Fig. 10, a high power picture of the former shows well the scantiness of the stroma and the variability in type of the epithelial cells in their nuclei.

These figures show that in both the common types of ovarian cyst gradual traumatic stages can be demonstrated from innocence to malignancy, so that it is difficult to define any dividing line between them. As it is our rule to remove all ovarian neoplasms as soon as they are recognized, the detection of pre-

cancerous condition is mainly of interest from the histologic standpoint. We do not know what is the cause of the formation of cystic tumors in the ovary.

In the remaining sections we shall be chiefly concerned with the effect upon the tissues of chronic irritation, beginning with the cervix.

#### CERVIX

Fig. 11 (taken from Eden and Lockyer's *Gynecology*) is a section through the wall of a cervix showing an "erosion" covering the whole of the free edge of the cervical lip. The mucous membrane lining the cervical canal is very thick and abundantly supplied with branching glands; many of these open by wide mouths upon the surface and others show dilatation of their deeper parts. The identity of the mucous membrane lining the cervical canal and that covering the area of erosion is quite clear. The stratified epithelial covering of the outer wall of the portio vaginalis is normal; note that its deep surface forms a slightly wavy line, the intrapapillary processes being only slightly marked. Where it joins the edge of the "erosion," the stratified epithelial layer is a little undermined by the wide mouth of a gland.

In Fig. 12 the stratified epithelial layer is fairly normal. Beneath it is a deep zone of intense round-celled infiltration; in this zone are also seen a dilated gland lined with columnar epithelium, showing the two changes in combination, glandular epithelial activity, with early inflammatory changes.

In Fig. 13 is shown to the right, normal stratified epithelium gradually tailing off to the left to end in a denuded surface. Intense leucocyte infiltration of stroma under the denuded surface and around many of the glands. Stroma contains actively proliferating glands, some dilated, others not; the type of proliferation is the inverting or papillary type in parts, in others the ordinary everting type.

In Fig. 14 the epithelium is a single layer and the cells are of normal type. The condition is therefore benign, but it is probably the forerunner of tubular cancer of the cervix.

Fig. 15 shows the edge of the cervical lip. The surface epithelium is greatly thickened and actively proliferating; there are broad, branching, intrapapillary processes dipping down into the stroma, some of which are seen in section as islets. Others are penetrating the gland spaces and are possibly solid processes traveling along the gland duct (this is suggested by the corkscrew arrangement). There is slight leucocytic infiltration. The condition cannot be definitely classed as either benign or carcinomatous but would have terminated as cancer, i. e., it is precancerous.

In Fig. 16 is shown to the left a normal stratified squamous epithelium. Beyond this the epithelial surface is broken by the mouths of glandular spaces; these are lined in parts by stratified squamous epithelium, in parts by typical columnar epithelium. The former show short papillary downgrowths; beyond the mouth of the second gland the surface is again seen to be formed by an atypical stratified squamous epithelium, with short papillary downgrowths. Beyond this is a normal gland. There is marked leucocytic infiltration in places. In the stroma is a dilated gland tube which shows inverting papillary processes,



one of which is composed of stratified squamous epithelium. Where the stratified epithelium is in relation to the gland tubes its type of proliferation is quite atypical; this is probably a metaplastic change, the columnar epithelium becoming stratified squamous.

In Fig. 17 the section is through the edge of an erosion which has been attacked by cancer. The left half shows on the surface a thickened stratified



Fig. 12.—Section from cervix showing inflammatory reaction. (From Eden and Lockyer, *Gynecology*.)



Fig. 13.—Section from cervix showing marked glandular proliferation (x 30).



Fig. 14.—High power of Fig. 13, showing normal cells in a single layer, although benign, is probably forerunner of tubular cancer.



Fig. 15.—Section from edge of cervix, showing marked proliferation of the squamous epithelium.

layer, with thick epithelial down-growths, some appearing as islands surrounded by stroma. The right half is recognizable as the seat of an erosion from the general contour of the surface and the wide compound gland-tubules which open on it beneath this part of the surface is a dilated gland space. Both the surface and the gland spaces are covered and lined with greatly thickened epithelium

of stratified type, which also has invaded the stroma beyond the limit of the section. The change appears to have affected both types of epithelium quite equally. In benign conditions we have seen that the two types of epithelium readily replace one another, e. g., in the formation of an erosion and in its subsequent healing. The same transition is seen in cancer affecting the cervix.



Fig. 16.—Section from edge of erosion attacked by cancer.



Fig. 17.—Section showing a squamous and polygonal-celled cancer of vaginal cervix and canal. (From Eden and Lockyer, *Gynecology*.)

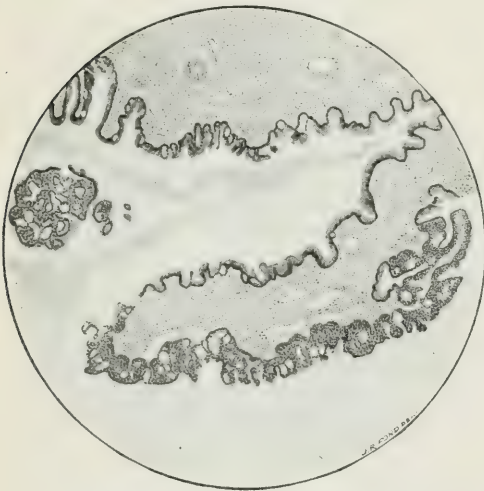


Fig. 18.—Section of a polypoid mucosal adenoma of cervix.



Fig. 19.—High power section of Fig. 18 showing conversion of high columnar into stratified squamous epithelium.

*Cervical Polypus with Early Cancer.*—Fig. 18 is a section showing a part of a polypoid mucosal adenoma of the cervix; on one surface the typical columnar has been largely replaced by a stratified squamous epithelium. The latter is actively proliferating, showing surface papillary projections and down-growths into the stroma. The conversion of high columnar epithelium into stratified



squamous is well shown in the high power slide (Fig. 19) where the stratified squamous processes appear to originate from the basement membrane of the columnar epithelium covering the surface and lining the gland.

#### CORPUS UTERI

In Fig. 20 is shown the menstrual gland with budding of glandular epithelium, swelling of stroma cells, and distention of capillaries.

Fig. 21 shows an example of benign cystic glandular hyperplasia. The gland tubes are irregularly dilated, tortuous, with considerable intratubular papillary proliferation. Cells are of normal type nuclei being regularly arranged.

Fig. 22 is from curettings obtained from a case of benign glandular hyperplasia. Gland tubules are numerous, little dilated, and in places somewhat closely packed; atypical epithelial proliferation is very free. There are short, irregular papillary projections into many of the gland tubes.

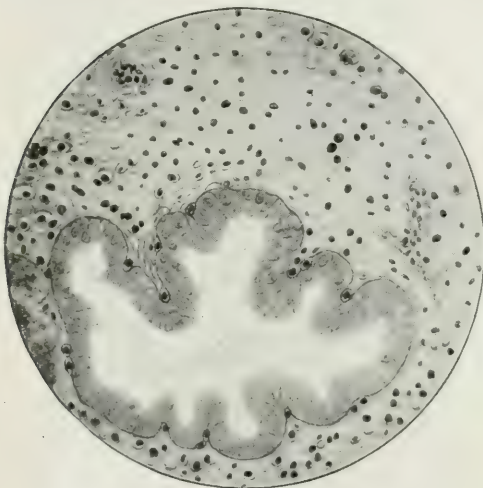


Fig. 20.—Showing menstrual gland from corpus uteri. (From Eden and Lockyer, *Gynecology*.)

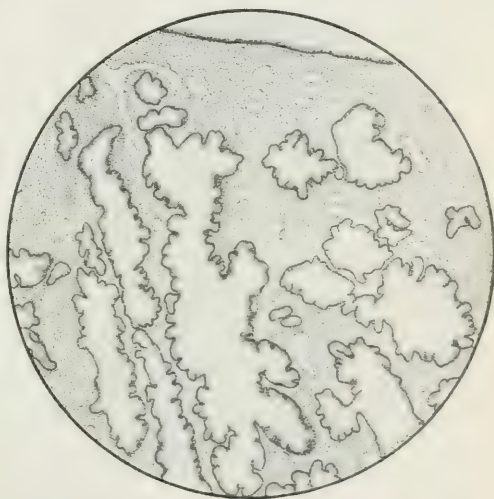


Fig. 21.—Showing benign cystic glandular hyperplasia of corpus uteri (x 60.)

Fig. 23 is a section from the edge of an atypical benign sessile localized adenoma of the corpus uteri. To the right is seen a normal endometrium with simple straight tubules. To the left are seen numerous closely packed tubules, varying greatly in shape; the columnar cells lining them have their nuclei at varying levels in many places and the cells are in more than one layer. This point is best seen in the high power. The upper layers are from the normal endometrium, the lower layers from the adenoma. In a curetting, very probably, the pathologist would return this as carcinoma; it is no doubt precancerous.

The next section (Fig. 24) is a curetting taken from a relatively normal (i. e., benign) area of a tubular columnar-celled cancer. The uterus was removed and a diffuse cancer of the endometrium was found: the area shown is similar to that in the last slide. Yet this was from the general point of view an undoubted cancer, while the former from the general point of view was undoubtedly benign.



In Fig. 25 is shown the edge of a papillary cancer of the endometrium. To the left is seen the normal postlimacteric endometrium; the mucosa is narrow, the gland tubes are scanty, and the stroma fibrous. To the right are seen irregular closely packed spaces and papillary processes; the former are in places lined by a columnar epithelium with markedly irregularly arranged nuclei, in places filled by solid masses of polygenol cells; the latter are covered by cells of similar type often in many layers. The scanty stroma shows leucocytic infiltration.

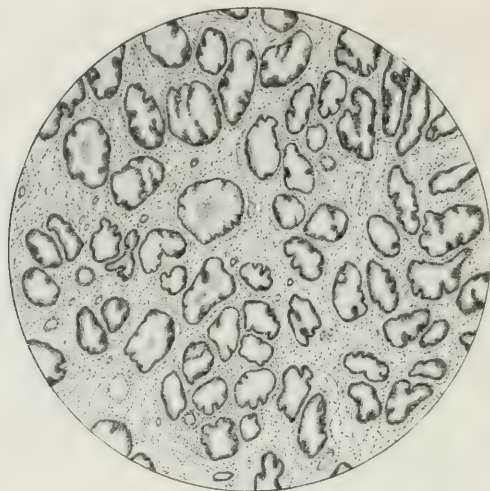


Fig. 22.—Showing benign glandular hyperplasia (x 65).

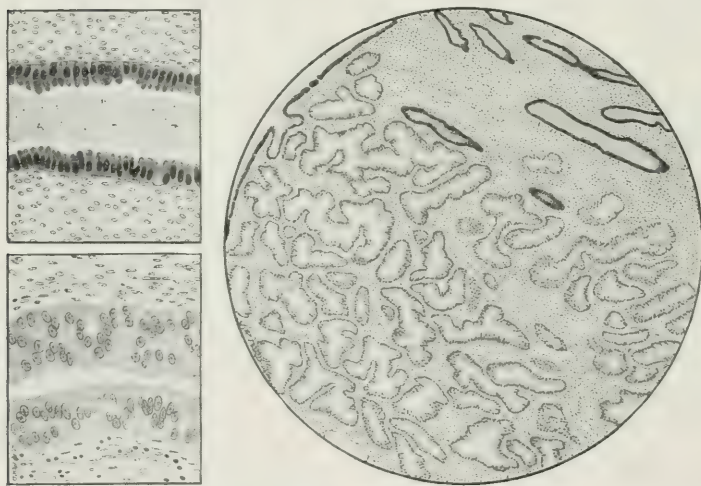


Fig. 23.—Showing atypical benign adenoma of the corpus (x 60) (above), and character of the epithelium (below) (x 240).

In Fig. 26 is a section from a case of leucoplacia. The horny layer is moderately thickened and stratified; the subjacent epidermal layer is greatly thickened, showing broad, irregular, deep interpapillary processes, with simple branchings or divisions; beneath the epithelial layer the dermis shows marked leucocyte infiltration. By fusion of epithelial branches islands of the dermis have been isolated. Epithelial proliferation and inflammatory changes are thus seen together.

Fig. 27 is a section from a case of pruritus with chronic vulvitis showing a similar condition under a high power. The horny layer is not well marked. The epidermal layer has the general characters seen in the last section. There is a very acute leucocytic infiltration around the bases of the interpapillary epithelial processes (high power), indicating marked irritation.



Fig. 24.—Section of columnar celled cancer (x 80).



Fig. 25.—Section showing edge of a papillary cancer of the endometrium (x 60).

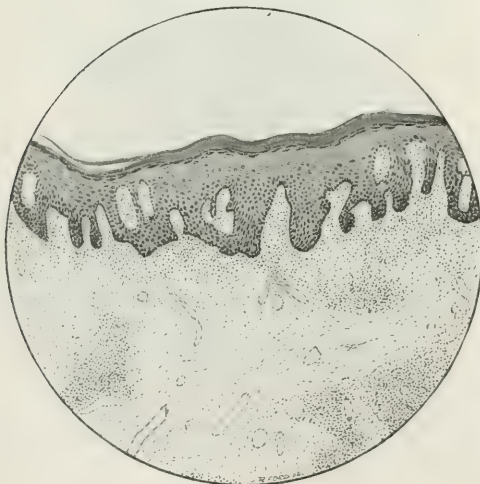


Fig. 26.—Section from a case of leucoplacia showing epithelial proliferation and inflammatory changes.

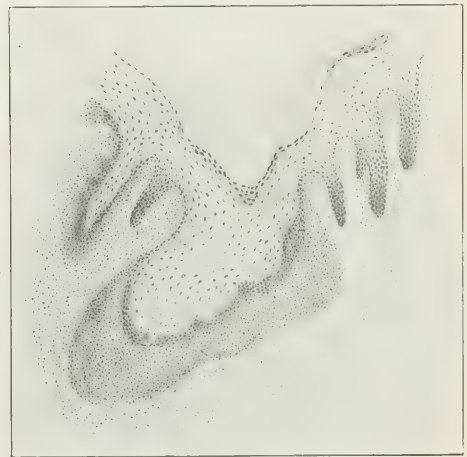


Fig. 27.—Section from a case of pruritus with chronic vulvitis (x 65). (From Eden and Lockyer, *Gynecology*).

In Fig. 28 the interpapillary epithelial processes are deep and irregular. The horny layer is absent and over a large area it has been replaced by inflammatory exudate, the whole epithelial layer is comparatively thin, but the ulceration has not penetrated through it completely. The dermis is extremely vascular and shows leucocytic infiltration. There is no approach to malignancy as a result of the ulceration.



Fig. 29 is a low power section through the cancerous area showing the leucoplacic changes at the extreme margin. Solid masses of epithelium have grown down for a considerable distance into the dermis; they are quite irregular in shape and are evidently fusing with one another. The surface is broken on the summit of the cancerous area (ulceration). The high power is through the edge of the cancer. On the left are the leucoplacic changes seen in the previous

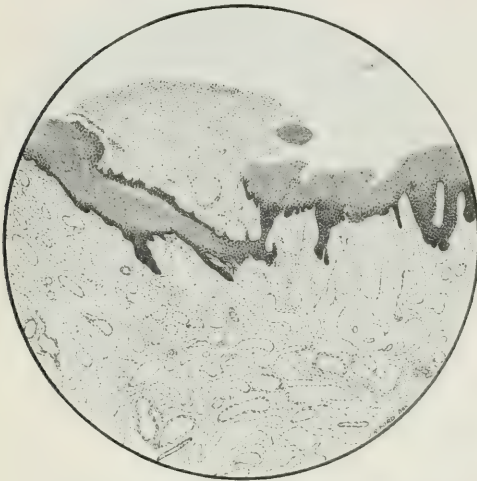


Fig. 28.—Section showing ulcerated area from leucoplacia, but with no approach to malignancy.

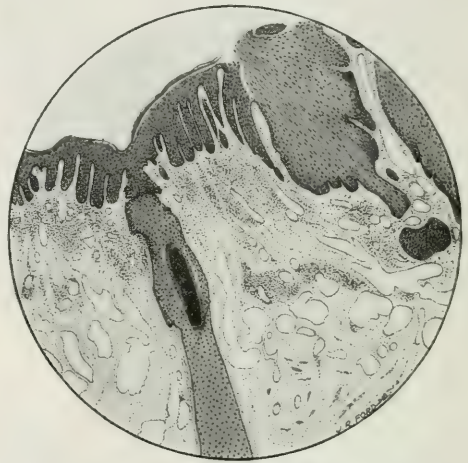


Fig. 29.—Low power section through a cancerous area, showing leucoplacic changes at the margin. High power below (x 592) through edge of cancer.

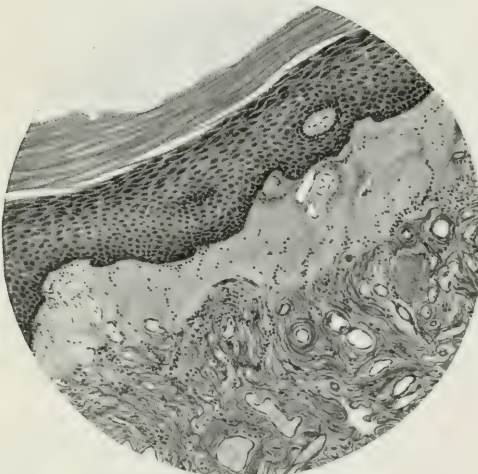


Fig. 30.—Showing a healing leucoplacia (x 70).

section, down the center of the field is a hair follicle. To the right are epithelial processes definitely cancerous, invading the dermis and subdermal tissues to a considerable depth. In this case an enlarged inguinal gland was removed which was definitely cancerous, thus confirming the diagnosis.

Fig. 30 is taken from a case of healing leucoplacia.



## CONCLUSIONS

1. It must be admitted that, speaking generally, the transition from benign to malignant histological characters is so gradual that it is very difficult to define a stage which can usefully be called "precancerous."

2. In the case of the ovary the detection of precancerous conditions is not of great practical importance if the rule is observed that all ovarian neoplasms should be removed as soon as they are detected. There is clear evidence that cancer occurs as a rule in an ovarian cyst, not in an unaltered ovary.

3. In the case of the uterine body, we hold that the condition shown in Fig. 23 is precancerous and such appearances, or any closely resembling them, should form an indication for panhysterectomy. The outstanding feature is the abundant atypical proliferation of gland tubules, and of the epithelium lining these tubules.

4. In the case of the cervix there is clear evidence that an erosion may heal, the columnar epithelium and glands being replaced by stratified squamous epithelium; this may occur either under treatment or spontaneously.

In other cases the erosion becomes the seat of a cancer and so far as we have seen, this is of the squamous-celled type. It will probably become in time established that it is the erosion which is accompanied by deep cervical laceration, by thickening and a diversion of the lips of the cervix, and histologically by abundant round-celled infiltrations, which is most liable to become cancerous. The form which occurs in nulliparous women is probably more benign. We therefore think that all standing cervical lacerations with thickened and everted erosions should be regarded as precancerous, and should be dealt with by free local excision. A radical operation is not called for in this condition.

5. Cervical adenomatous polypi may become also malignant, but we have been unable, in the case of these very common neoplasms, to find anything that could be called a precancerous stage; early removal is the universal practice and the point is therefore not of great clinical importance.

6. With regard to the vulva, we hold that chronic vulvitis is, generally speaking, not precancerous. Leucoplacia, like cervical erosion, may heal under treatment, or may go on to the formation of squamous-celled cancer. A leucoplacia which is accompanied by an enlargement of the inguinal glands is precancerous and should be treated by free excision of vulva and the glands.

We have seen three cases of glycosuric vulvitis which developed cancer and we suggest that this form of vulvitis may prove to be specially prone to be followed by cancer; further evidence is in the meantime required on this point.

We have found no evidence that gonorrheal warts show the least tendency to become malignant.

## THE INDUCTION OF LABOR AT TERM\*

BY CHARLES B. REED, M.D., F.A.C.S., CHICAGO, ILL.

FROM the time of Van Deventer (1701) to the present, our best obstetric thought has been devoted to the study of contracted pelves and the dangers and difficulties which these anomalies develop in the course of pregnancy and labor. This work has been pursued with an engrossing interest and has brought about additions and technical accessions to our knowledge of wide and far reaching importance, so essential and vital indeed as to constitute the very foundation of obstetric science.

Meanwhile but little attention, comparatively, has been paid to the corresponding problem which concerns the large, the mature and the postmature child. It is obvious that the large child, whether mature or postmature, must meet with obstruction in a normal pelvis and produce just as serious a complication of labor as the generally contracted pelvis with which it competes for an evil preeminence.

In spite of narrower interest, however, this aspect of the subject has been approached from various angles and one man after another has investigated and solved with reasonable accuracy several of its phases. These results are quite practical and may be summarized for specific application.

The duration of pregnancy is an important feature which has been reported upon by Ahlfeld, Casalis, Issmer, v. Winckel and others. Their work leads them to conclude that the average period for human gestation should be set at from 270 to 280 days with an allowance above and below these figures of about thirty days to provide for the uncertainty as to the incidence of fertilization and the accidental element in the onset of labor. They generally accept 275 days as an approximation to the actual elapsed time between conception and fetal maturity. This period is remarkably exact if we consider our entire ignorance of the date of fertilization and of the phenomena that determine the onset of labor. The end of the pregnancy is conveniently recognized by the word "term," which is not only too broad but wholly noncommittal.

It is a matter of common knowledge that a pregnancy may either be abbreviated or prolonged beyond the time set, but the prolongation of pregnancy is the less frequent. This phase of the question has been worked out by Parvin, who found that from 6 to 8 per cent of all pregnancies are more or less prolonged.

v. Winckel again has examined the effect of this delay in the onset of labor upon the fetus *in utero* and concluded that the phenomenon was regularly associated with large babies. He became convinced also that of all babies weighing more than eight and one-half pounds, 71.8 per cent were postmature. In other words, whatever the period of gestation, the time of fetal maturity had been overstepped.

\*Read (by invitation) at the Forty-fifth Annual Meeting of The American Gynecological Society, Chicago, May 24-26, 1920.

It is evident that neither the menstrual history nor the known date of coitus does, or can, give us more than an approximation to the actual date of labor. Some other basis must be found from which to calculate the duration of pregnancy, or at all events, the proper time for the onset of labor. It seems more logical, as it certainly is more promising to determine the time for the normal onset of labor, not by the days or weeks spent by the egg in the uterus but by the effect of that incubation on the fetus. The purpose of pregnancy is the production of fetal maturity. When the child is mature, the normal end of intra-uterine life has been accomplished.

What constitutes maturity? If we can establish the signs of this phenomenon and have the means of recognizing them in the uterus, it will be possible to say at a given time that the mission of gestation has been fulfilled.

Theoretically the child should be mature when the embryonic type of cell has been transformed into the mature type, but this is not so. Ballentyne, with good reason, bases the attainment of maturity on the physiologic perfection of the organs. He makes the point that as soon as the organs are prepared to functionate satisfactorily in an extrauterine environment, the fetus is mature.

This anatomic and physiologic perfection, however, must needs be secured by such a residence in the uterus as permits the child to achieve a constant and rapid growth, not only of the organs, but also of the structure and the connective tissue. This growth and development persists until not only the organs but certain more or less stable general characteristics have been formed and fixed.

The fetus now presents that physical appearance of wholesome sturdiness which is so quickly recognized as maturity by the expert, but is so difficult to describe. The child shows also a definite capability for an extrauterine existence, and we may therefore tentatively accept Ballentyne's definition of maturity as "that state or degree of fetal development which enables a child to surmount the perils and aggressions of extrauterine life easily."

Meanwhile, the child has acquired some rather definite characters which are authoritatively recognized as the gross evidences and criteria of maturity. The most important of these are the length and size of the fetus, and the fetal head diameters. On these phases of the problem much time and thought have been expended. The results of this work have been given in considerable detail elsewhere, but for the sake of completeness, it is desirable to give a summary.

The length, logically, should be regarded as the most important sign of fetal maturity. Fortunately the limits of this criterion have been widely discussed and rather generally accepted. Ballentyne, Hirst, Hecker, Webster, Edgar, Dorland, Cragin, Eden, Peterson, Ahfeld, Stumpf, Williams and Issmer agree that the length of a mature child should be 50 cm. to 51 cm. All admit the possibilities of 48 cm. and some extend the upper boundary to 54 cm. Our own series gave measurements that varied from 48 to 53 cm. with an average of 50.2 cm. All the babies were mature according to the definition. Babies of less than 48 cm., except twins, are not ordinarily mature, and babies cannot exceed 53 cm. in length without, in our opinion, entering the postmature class.

The size is next in importance. Without tiring you by a repetition of familiar figures, let us recall briefly that Hirst, Dorland, Edgar, Webster, Eden,



Goenner, Cragin, Jewett, Stumpf, Williams, Ahlfeld and MacDonald place the weight of a mature child at from 6 to  $7\frac{1}{2}$  pounds with a low limit of  $5\frac{1}{2}$  pounds and no mention of an upper boundary. Only by implication do we learn from this silence that babies that have long been mature must of necessity be postmature. The designation *postmature* is not common in literature.

The diameters of the fetal head are the next point that concerns us. v. Winckel states that the average occipitofrontal diameter in maturity is 12 cm. and the biparietal 9.25 cm. Our own series gave the occipitofrontal in mature babies as ranging from 10 cm. to 12 cm. and the biparietal from 8.5 cm. to 10 cm. In our opinion all babies that possess the above described characteristics of length, weight and fetal head diameters within the limits set are mature and those which register below or above these boundaries are, ordinarily, immature or postmature, respectively.

With these various measurements in mind, it is now possible to complete our definition and assert that maturity is that state or degree of development wherein the fetus is enabled to surmount the perils and aggressions of extrauterine life easily and that such development is associated with a fetal length of 48 to 53 cm.; a weight varying from five and one-half to possibly nine pounds and heads that measure from 10 to 12 cm. in the occipitofrontal and from 8.5 to 10 cm. in the biparietal diameters.

By this definition, if we use the word "term" at all, we should use it to signify that the fetus has attained physical maturity instead of to indicate that the uncertain end of an indefinite time is approximately due. Moreover it does not seem superfluous to reiterate that when the fetus falls within the scope of this definition, the end of profitable intrauterine life has been accomplished and a continuance thereof can only be an indifference, if not an invocation, to all those dangers, morbidities and mortalities which are so familiar to us in cases of contracted pelvis and therefore of the overlarge child.

It is not a catastrophe, ordinarily, for labor to occur a couple of weeks before the maturity of the child as we have defined it, but there is a steadily increasing danger to mother and child for every additional week of postmaturity. The child continues to develop at the rate of from 0.5 cm. to 1.0 cm. in length, and from one-half pound to one pound in weight each week and this increase in size necessarily intensifies the obstetric problem and by raising the chances of serious operative complications adds materially to the peril.

The intrauterine child goes to maturity just as, later, the delivered baby ripens into an adult. In both cases, where maturity is attained, if the nutritional intake exceeds the expenditure, the tissues will store up fat and become infiltrated with fluid. The abundance of this fat is not a sign of maturity, but of postmaturity. These accessions of fat, moreover, are as worthless to the infant as to the adult. An excess of fat and fluid in the tissues of the baby hampers rather than facilitates organic action and furthermore, both fat and fluid are lost rapidly after birth. As we have shown elsewhere, babies that average 7 pounds lose  $8\frac{1}{2}$  ounces in the two and one-half days following birth and then begin to gain, while babies that average  $9\frac{1}{10}$  pounds lose  $14\frac{1}{2}$  ounces in about the same time before the gain begins. The increase in bulk, therefore, has served merely to complicate labor without any corresponding advantage to the child.

A consideration of the data thus reviewed has led us to believe that it is timely and desirable to apply to all cases of fetal maturity the principles of management that we sometimes employ in contractions of the pelvis. In other words, when the child becomes demonstrably mature, labor should be induced at the first convenient opportunity. In pelvic contraction, to be sure, the anomaly becomes apparent as soon as the appropriate tests are applied, while the presence of a mature child has rarely been regarded hitherto as even a potential peril. Nevertheless where we induce labor for pelvic contraction, we act, if we are wise, before the crisis appears even though the child be submature, so why hesitate to avert a similar complication when maturity is present.

The diagnosis of pelvic contraction after two centuries of education has become a more or less successful routine, but the diagnosis of fetal maturity which is far easier is not so common. The methods for determining maturity have been before the profession for some years, but they have not as yet received the stamp of approval and current usage.

The technic of these methods is doubtless familiar, at all events descriptions are readily available in the literature and need not be dwelt upon here. It is desirable, however, to report our own experience with them.

The length is ascertained by Ahlfeld's maneuver. In our series the postpartum figures tallied exactly with the antepartum estimate in 37 per cent. The variation was less than 0.5 cm. in 24 per cent and less than 1.5 cm. in 29 per cent of the cases.

The weight and size of the child are estimated by the method brought out by McDonald some ten years ago. He assumes that when the uterus contains a mature fetus weighing  $7\frac{1}{2}$  pounds (3300 grams) the fundus will be 35 cm. above the symphysis. He also estimates that the weight of the child will be increased or diminished by 200 grams for each variation of 1 cm. in the height of the fundus. So far as concerns the maturity of the child we found this method practical and safe, but the estimates of weight were not so reliable, although they did not pass the limits of security.

The problem of the fetal head diameters was one of absorbing interest. Only two, of course, are possible, the occipitofrontal and the biparietal, but fortunately these are the ones most needed. They are obtained by Perret's maneuver. Thus the occipitofrontal is measured as it lies more or less transversely across the inlet without making any allowance for the thickness of the abdominal walls. From this result the biparietal is estimated by a system of deductions according to a scale suggested by Perret and elaborated by McDonald. If the occipitofrontal measures 12 cm., for instance, 2.5 cm. is deducted to get the biparietal. From 11.5 cm. occipitofrontal we take 2.25 cm., from 11.25 we take 2 cm. and from 10.0 cm. we take 1.5 cm. to get the biparietal.

In our series the postpartum measurement of the occipitofrontal tallied exactly with the antepartum estimate in 40 per cent. The variation was 0.25 cm. or less, in 34 per cent, and within 0.5 cm. in 24 per cent and erred by 1 cm. in but 4 per cent of the cases.

The biparietals obtained from the above occipitofrontals were found postpartum to be exact in 36 per cent, within 0.25 cm. in 31.7 per cent within 0.5 cm. in 24 per cent, and to vary by 1 cm. in but 6.5 per cent of the cases.

It is obvious that these differences are too slight to affect the diagnosis appreciably. All the babies but one were mature. Our sole failure was due to the stupidity of an interne. No system or technic however can be entirely free from the possibility of abuse. These maneuvers are quickly learned, their application is easy and the results surprisingly accurate.

With the determination of the length and size of the child and the two principal diameters of the head, it would seem that the question of maturity is safely assured. The problem of the pelvis is admittedly a matter of technic and the sole remaining point is the induction of labor. Whether or not the maturity of the child be generally accepted as a satisfactory and legitimate basis for bringing on the labor, at all events, our ability to induce the delivery at will is an important addition to our obstetric armamentarium.

#### TECHNIC OF INDUCTION

The labor can be inaugurated by castor oil and quinine, by quinine and pituitrin or by the modified de Ribes bag (Voorhees bag). The castor oil and quinine acts in about two or three cases out of five, and most reliably when the patient is a little bit beyond her calculated date. The bag in our experience has been the most dependable and is therefore the favorite agent at our hospital.

The patient's bowels should receive attention the night before, and in the morning the external genitalia are given a careful obstetric preparation.

Assemble and sterilize by boiling for 20 minutes, a modified de Ribes bag (Voorhees) No. 4, a Simon speculum or vaginal retractor, a pair of long Pean forceps (dressing forceps will serve), two pairs of vulsellum forceps, two pairs of compression forceps, a Goodell dilator, a tenaculum forceps, a hand bulb syringe, or metal piston instrument holding six or eight ounces, and glass tubes or rubber connections for the bag and syringe. The bag and accessory apparatus must be tested for defects before using.

The patient, prepared as for delivery, is placed upon the operating table in exaggerated lithotomy position with the legs held by assistants or by stirrups.

The vagina is retracted, a smear made from the cervix and the mucous membrane wiped clean with pledgets. Anesthesia is rarely necessary even in primiparæ.

One lip of the cervix is seized by the vulsellum and brought down. If the bag has been properly prepared the os will admit it ordinarily without dilatation.

The bag is emptied of any residual air and the flat end pulled out. It is next rolled into a compact mass like a cigarette and seized by the Pean forceps so that the tips extend just to the largest diameter of the rolled bag. After anointing the bag with sterile glycerine it is passed into the cervix with the concavity of the forceps turned slightly toward the patient's left leg and as it enters the os the concavity is turned upward one quarter of a circle so that when the maneuver is completed the hollow of the forceps conforms to the flexure of the uterus. Release the lock of the Pean forceps. Connect the tube of the bag with the filling apparatus and force the sterile solution—lysol, boric acid or plain water—slowly into the bag. Do not overfill by force, or the bag will break.



Tension in the tube leading from the bag, or the feeling of resistance to the injection are signs of fullness to an experienced operator. If uncertain of the technic, a measured amount of fluid may be used. A piston syringe of tested size will also serve to inform the operator when the capacity of the bag—six ounces—has been reached. The Pean forceps are removed as soon as the bag is sufficiently filled to keep it from following the forceps in the withdrawal. Snap the compression forceps on the tube. Remove the vulsellum from the cervix and disconnect the syringe. Tie the tube firmly with tape. Remove the compression forceps. Place sterile pads on the vulva, one on either side of the tube. Remove the stirrups and pull the patient up.

The bag may, from either rapid or insufficient filling, slip out of the cervix before the uterine contractions begin. If this happens another bag should be inserted.

If the pains do not start within an hour, a weight of one or two pounds is attached by a tape to the protruding tube and passed over the foot of the bed or table. Usually in from five minutes to half an hour the contractions begin and the labor is under way. In a variable period, rarely more than four hours, the bag is expelled by strong pains, the dilatation is practically complete and the head follows the bag down into the pelvis, the membranes rupture and the second stage begins. From now on the case is managed according to general obstetric principles. The tedious, exhausting, and painful first stage has been materially shortened. The bag acts as a mechanical aid to cervical dilatation, a dynamic stimulant to the contractions, and preserves the membranes from injurious pressure until physiologic rupture occurs.

When the membranes have been accidentally ruptured by the insertion of the bag, no attempt should be made by pulling on the bag to mark the degree of advancement lest it come out and by suction bring down the cord. Also when the bag comes out after such an accidental rupture of the membranes, it is good practice to make an internal examination to discover the presence or absence of a prolapsed cord.

In the series of 200 cases hitherto reported we had 114 multiparæ and 86 primiparæ. The average duration of labor was seven hours and fifty-six minutes. The longest labor was 30 hours and was due largely to a tough, inelastic cervix. Two others were 28 hours long on account of cervical conditions. One had a mass of cicatricial tissue. The shortest labor was 55 minutes in a multipara and 60 minutes in primiparæ. The bag broke while being filled or shortly after insertion, nine times. A second bag was necessary in four cases. The membranes were ruptured by the insertion of the bag seven times—in one case intentionally on account of hydramnios. The bag was expelled in an average period of 3 hours and 20 minutes. The longest detention was 9 hours, the shortest 10 minutes. Two mothers died. One had a myocarditis associated with marginal insertion of the placenta. Her labor lasted only an hour and a half and she lost less blood than usual, but she died two hours after delivery. The other had pneumonia and died eight days after delivery.

In no case did the bag fail to initiate the pains or the woman to deliver. The average weight of the babies was 7.4 pounds. The smallest weighed 5 pounds, the largest 10 pounds. Twelve babies died. One child of a primipara

was born in asphyxia after sixteen and one-half hours of labor, was revived with difficulty, and died eight hours later. One child of a multipara, born blue after a labor lasting one and one half hours. Revived. Died suddenly thirty-six hours later. Two died on second and fourth days respectively of hemophilia. One died of toxemia on the seventh day. One was the child of a primipara with a small pelvis. The delivery was instrumental and the baby died two hours after birth. One died after a forceps delivery, the occiput being posterior. Two were stillborn. One died in the course of a rapidly progressing second stage half an hour after the heart tones had been strongly evident. The other with heart tones diminishing was delivered with forceps but did not survive. Two died from the prolapse of the cord, one being luetic. One was premature as previously explained and the death was inexcusable.

The following operations were done: Version and extraction four times for cases of placenta previa transverse presentation, prolapsed cord, and to expedite labor in a heart case.

Forceps were used 39 times: occipito-posterior position, 11; deep transverse arrest, 15; insufficiency of the powers, 4; to hasten labor, 5; and for instruction, 4.

There were two cases of prolapsed cord.

Our employment of forceps may seem excessive to those who are guided by the statistics from large clinics wherein the women delivered are mostly normal and of strong physique. It does not seem improbable, however, that those of our colleagues who have much to do with our overcivilized American women will find in his private practice a larger percentage of forceps cases than in his clinical work.

Three of our women developed temperatures. One was due to pneumonia, one to tuberculosis, and one to mastitis.

No dilatation was required in any case prior to the introduction of the bag. In but five cases was anesthesia employed for the insertion of the bag and then for nervousness rather than for pain.

To these cases we now add 24 others that gave the following results: Multiparae, 15; primiparae, 9. Average detention of bag in utero, 4 hours, 1 minute. Average duration of labor, 6 hours, 11 minutes (1 history imperfect). Twenty-two babies averaged 7 pounds, 1 ounce. *Operations*: Low forceps, 8 (deep transverse arrest 4; prolapsed cord, 1; heart case, 1; inertia 2). Version and extraction 1 for prolapsed arm. Pubiotomy 1, for delay of aftercoming head. There were no maternal deaths. One baby died from prolapse of the cord. Pains began in all cases in less than an hour.

It is a pleasure also to report 34 cases from the service of Dr. C. E. Boys, of Kalamazoo. Thirty of these were inductions at term. Average detention of the bag in utero was five and one-third hours. Average duration of labor eleven and one-fourth hours. Pains began promptly in all cases but one, where they failed entirely. *Operations*: Forceps 10; version and extraction, 1. Largest baby 9½ pounds. Smallest 5⅝ pounds. Prolapsed cord, 2. Maternal mortality, 0. Fetal mortality, 3, two from prolapsed cord and one from forceps injury. In seven cases the temperature ranged from 100° F. to 101° F. on the

third day. All were operative cases in which the rise could be traced to other causes than the induction.

It is also my privilege to report 270 cases of induction from the service of Drs. George Clark Mosher and Buford G. Hamilton of Kansas City. One hundred ninety of these were for labor at term and 80 for moderately contracted pelvis or toxemia. In 24 cases the bag was used to replace prematurely ruptured membranes. In all cases castor oil and quinine preceded the bag by fourteen hours or more, but in only eighteen was the bag rendered unnecessary. The average detention of the bag *in utero* was six hours and twenty-five minutes. The average duration of the labor in multiparæ, eight and one-half hours; in primiparæ, twelve hours. The shortest labor was one and one-fourth hours (mp). The longest was sixty hours and required a second bag. Six cases failed to deliver after the bag was expelled.

Maternal mortality 5, from nephritis, endocarditis, and other complications independent of the induction. Babies' mortality 3.8 per cent, which is well within the average.

*Operations.*—Total for all cases about 35 per cent (forceps and versions). Mosher states that this is about the average in their general work where the fetal heart tones are the principal guide for interference. The cord prolapsed in three cases, and in one apparently followed the descent of the bag.

All cases were checked by routine measurements before and after delivery, and the bacillus coli were found, but though the induction proceeded, we had no appreciable displacements of the presenting part, and no hemorrhages chargeable to the bag.

Certain objections have been urged against the use of the bag for the induction of labor. The most persistent of these is the menace of infection. In the early cases this fear was constantly before us and cultures and smears were made from the cervix in every instance. Streptococci, staphylococci, gonococci, and the bacillus coli were found, but though the induction proceeded, we had no postpartum infections. This result was quite puzzling until it occurred to us that the comparative shortness of the labors might be a factor in conserving the patient's immunity. It is our conviction now that prolonged labors, though nonoperative, are more disintegrating to the morale and more disastrous physically than extremely painful deliveries that are soon terminated. This opinion might be stretched enough possibly to cover the operative deliveries in which the trauma is not excessive. Lynch, Mosher, Boys, and others who have used the bag sufficiently agree thoroughly with the writer that the danger of infection may be disregarded if a good technic is possible.

It has been charged also that the introduction of the bag may disturb the presenting part and cause malpositions. This possibility, which always hung over us in the earlier days when the Carl Braun bag was commonly employed, and even later with the huge de Ribes affair, does not seem to be much in evidence at present when the small flat topped fabric bag is used. A further insurance against the accident inheres in the self-control of the operator who contents himself with leaving the bag in the cervix where it belongs in place of trying to carry it to the fundus. So while admitting its possible or occasional occurrence, as Brodhead has also noted, yet we must regard the dislocation of



the presenting part as extraordinarily rare. Moreover if the head is lifted by the introduction of the bag it must soon resume its original position when the bag descends. In our second series we kept careful records of the positions and could not find an appreciable variation from the usual averages.

Whether a disturbance of the head is sufficient to encourage a prolapse of the cord is still uncertain. Lynch maintains that a long cord is prerequisite to a prolapse. If it happens therefore that a long cord should coexist with a marked disturbance of the presenting part it is probable that the mechanical conditions are present which permit a prolapse.

It is further charged that the bag is unreliable and that in many instances the pains cease after the bag is expelled and the induction fails. Although we have not had this experience, yet Lynch reports eight, Mosher six, and Boys one. We must therefore accept this event as infrequent but certainly possible in the hands of unimpeachable technicians. However, the bag is not an intelligent instrument and it cannot be left to its own devices if good results are desired. It may break or come out, it may leak or fail to advance and so the process must be watched assiduously from the moment of the insertion of the bag. Occasionally it may be advantageous to swing the bag to one side or release it from the weight so that it may change position or shift its point of pressure. When the pains are weak or slow in starting, it sometimes happens that a gentle massage of the uterus for a half hour or so will aid in bringing on or strengthening the contractions. The most common cause of failure is found in the practice of some operators who introduce the bag and then leave the case with no one at all or only an inexperienced technician in charge.

"Meddlesome midwifery" is the alliterative imputation that is loosely and almost instinctively made against the induction of labor by those who wear congenially the trammels of tradition. Wright, of Toronto, answers this objection quite clearly. He says, "If we can perform this operation in such a way that it causes no danger, or at least very much less danger to the patient than the prolongation of the pregnancy involves, then we must conclude that such interference is not only justifiable but advisable."

In our own experience at Wesley Memorial Hospital, it has seemed at times as if the pains of an induced labor were not quite so strong as in cases not induced. Whether the average of weak pains is larger or smaller than in noninduced cases we cannot say. Drs. Lynch and Mosher have both noted a diminished uterine irritability, a lessened responsiveness to the bag in cases of toxemia. Nevertheless Mosher insists that the bag is the most successful method of treating these cases. He also considers it a valuable aid in reducing infant mortality. It is generally accepted at present that an induction should be done in a properly equipped hospital and it is presupposed that the operator is familiar with the ways of measuring the child *in utero*.

In conclusion it seems to us that the modified de Ribes bag is a safe and efficient agent for the induction of labor at "term" and when properly used is open to but few objections.

Furthermore we think our experience justifies us in stating that not only is no harm done, but a large element of potential danger is averted by inducing labor when the child is mature. By this judiciously timed procedure, the con-

tractions of labor may be inaugurated when the child is ripe, but yet small enough to pass the pelvic canal without extreme difficulty. The mother is spared from four to six hours of suffering as well as serious operative trauma and she rises from her confinement quickly and with unimpaired vitality.

A minor feature, but one not altogether unimportant, is the knowledge that the gestation will terminate on a definite date. This is both a mental and a financial relief to the patient and a marked convenience to the doctor. Neither he nor the patient is taken unawares, but with the same equanimity and confidence that attends any other nonaccidental surgical engagement, the contractions are started in the morning, the labor advances smoothly and easily for mother and babe and terminates generally in the afternoon or evening.

Under such conditions of election, it is easily possible and convenient for the physician and his skilled assistant to give the patient the time and attention which all labors require and relatively few receive.

Medical thought is tending ideally toward prophylaxis. We strive to foresee and prevent pathology rather than await its onset. This is prudent prophylaxis.

We believe that by the simple and easily applied tests which we have discussed in this paper fetal maturity *in utero* may be diagnosed definitely and unmistakably. We believe that the induction of labor by the method described is a safe and efficacious procedure. We believe that by combining these measures the uncertain arrival of a large or postmature child will become, as it should, an exceedingly rare occurrence and that it will happen only as an inadvertence, or as a result of temporizing which, not unjustly, would be looked upon with dismay in other branches of surgery.

## THE PROPHYLACTIC FORCEPS OPERATION\*

BY JOS. B. DeLEE, M.D., CHICAGO, ILL.

THE time is not yet ripe for a general recommendation of the procedure to be described in this paper. As obstetric specialists, we must lead the way in improvements of our art, for this is still capable of improvement. The public is demanding with a voice that becomes louder and more insistent each year, relief from the dangers of childbirth for the childbearing woman. As regards the pain, the rapid spread of the twilight sleep craze will show that the demand for "tokophobia" is spreading among women.

If we study our cases carefully the conclusion is inevitable that while we have decidedly improved the maternal mortality and morbidity and have reduced the fetal deaths somewhat, labor is still a painful and terrifying experience, still retains much morbidity that leaves permanent invalidism. The latter statement is also applicable to the child. Many efforts are being made to ease the travail of the woman and to better the lot of the infant. What follows is another such effort. Experience alone can decide whether it accomplishes its purpose.

The "prophylactic forceps operation" is the routine delivery of the child in head presentation when the head has come to rest on the pelvic floor, and the early removal of the placenta. Primiparous labors and those in which the condition of the soft parts approximates a first labor, are treated by this method, which really comprises more than the actual delivery of the child. It is a rounded technic for the conduct of the whole labor, with the defined purpose of relieving pain, supplementing and anticipating the efforts of Nature, reducing the hemorrhage, and preventing and repairing damage.

It is not a complete reversal of the watchful expectancy that is universally taught, but I cannot deny that it interferes much with Nature's process. Were not the results I have achieved so gratifying, I myself would call it meddlesome midwifery. For unskilled hands it is unjustifiable.

A typical case is treated as follows: As soon as the pains are well established and the cervix opened two to three centimeters, the parturient is given  $1/6$  grain of morphine and  $1/200$ th of the scopolamine. After one hour  $1/400$  of scopolamine is given and in one or two hours occasionally a third dose of the same size. The room is darkened and suggestion used as much as possible to aid the medicines. This is really a modified twilight sleep and usually the cervix dilates and the head comes down on the perineum without the necessity of further drugs. Occasionally 15 grains of chloral and 40 grains of sodium bromide are given *per rectum* to aid the morphine, or gas and oxygen are administered by an expert. It is important to obtain complete *spontaneous* dilatation of the cervix, and the slower the better. The importance attached to this point, the natural dilatation of the cervix and the slow retraction of the pericervical connective tissues, cannot be exaggerated. We are unable to imitate this by art.

\*Read at the Forty-fifth Annual Meeting of The American Gynecological Society, Chicago, May 24-26, 1920.



When the head has passed the cervix and rests between the pillars of the levator ani and has begun, just begun, to part them and to stretch the fascia between them—a matter that is easily determined by rectal examinations, the patient is put to sleep with ether, and a typical perineotomy (soon to be described) is performed. Under the minutest possible control of the fetal heart tones—either the operator or an assistant listening every minute, with the head stethoscope—the forceps are applied and delivery accomplished. This is usually surprisingly easy. As soon as the child's head is born, 1 c.c. of Burroughs and Wellcome's Pituglandol is injected into the deltoid muscle. A nurse stands ready with 1 c.c. of aseptic ergot and this is injected into the outer thigh muscles as soon as the placenta is visible in the vulva. If there is hemorrhage, the placenta is removed at once, if not, we wait five to ten minutes. The operator either changes his gloves or disinfects them with antiseptics, and if the placenta is not already visible in the vulva, inserts the left hand into the vagina or the lower uterine segment, palm up, while with the outside hand the hard (pituitrin) uterus is pushed down on the already descended placenta. The placenta slides down the hand like a heel slides along a shoehorn. We call this method of expression of the placenta the "shoehorn maneuver," and it is the rare exception that the placental delivery needs more help than light pressure on the contracted uterus from above. Should there be any undue bleeding, another ampoule of pituitrin is injected directly into the uterine muscle through the abdominal wall. Uterine tamponade is almost never needed.

The woman is now given  $\frac{1}{4}$  grain of morphine and gr. 1/200 of scopolamine to reduce the amount of ether required for the repair work, to prolong the narcosis for many hours postpartum, and to abolish the memory of the labor as much as possible.

It is surprising how bloodless the operative field, especially the cervix, has become. The cervix is pulled down with specially constructed ring forceps and all tears immediately repaired. I have thus gained a large experience in cervical tears and find it necessary to revise my previous notions of their anatomy. The cervix tears often even in spontaneous deliveries. The body of the cervix frequently tears, leaving the mucosa, internal and external, intact. Later such cervixes show all the evidences of laceration, chronic inflammation, eversion, erosion, etc. Those lacerations which are open also show the separation of the muscle of the cervix at the sides, and the deep retracted portions of the wound must be pulled out and united, preferably with buried sutures. Our previous failures in cervical repair were, I believe, due to nonrecognition of this fact.

#### THE PERINEOTOMY

The technic of repair is one of the most important steps of the procedure. It is essential to have clear notions of the normal anatomy of the pelvic floor and how the structures are changed during delivery. The models (see illustrations) are intended to show these things. The head advancing through the hiatus genitalis (1) stretches the vagina radially and longitudinally—it also sometimes, wipes the vagina off its fascial anchorings, sliding it downward and

outward. (2) The head stretches the pelvic fascia over the levator ani, and between the rectum and vagina and the layer behind the rectum, also radially and longitudinally, and this also permits the rectum to be wiped downward and slid off its fascial attachments to the levator ani; (3) the head often tears, or over-stretches the fascia over the levator ani, especially those bundles which hold the pillars of the muscle in position at the sides of the rectum, spanning the hiatus genitilis, and this permits the pillars to separate,—a real diastasis of the levator pillars resulting. The pathology is similar to that of the diastasis of the recti abdominales. This diastasis of the levator pillars and the wiping or sliding of the

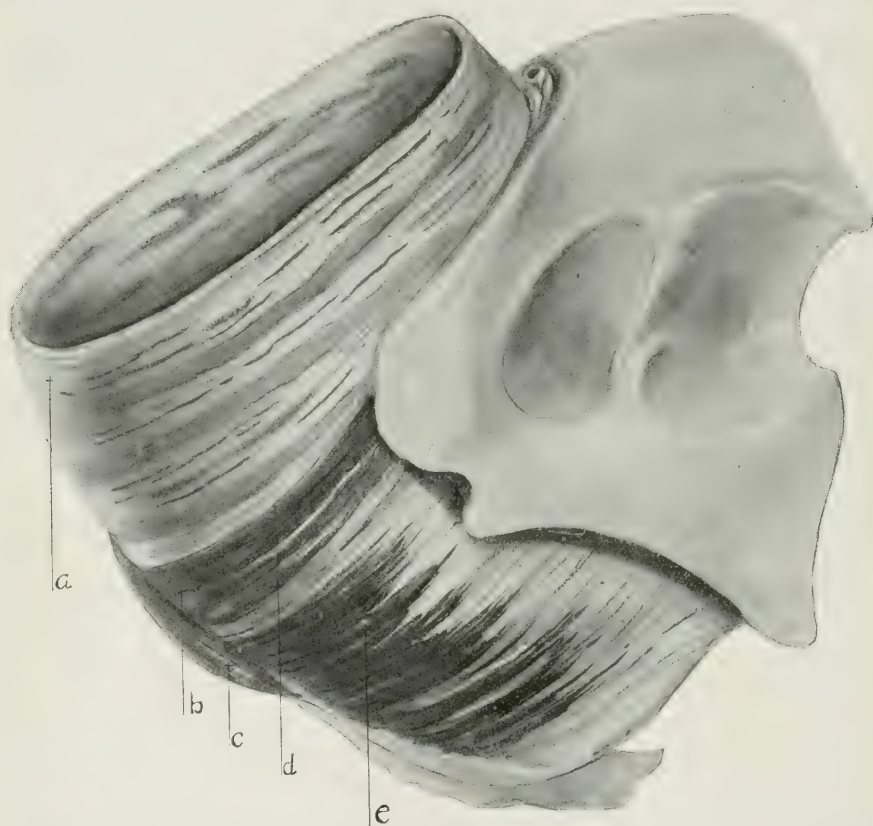


Fig. 1.—Partly diagrammatic to show the axial displacement, the distraction, and rupture of the fascia and muscles during the passage of the fetal head. *a*, Urogenital septum much distracted; *b*, usual site of rupture of levator ani; *c*, sphincter ani; *d*, levator ani pubic portion or "the pillars;" *e*, levator ani ischio-coccygeal portion.

rectum and vagina downward and outward are the essential features of most pelvic floor injuries have been, to my mind, the least noticed by current writers. (4) The tears in the levator ani muscle are usually due to improper treatment, and they occur least commonly near the insertion of the muscle on the pubic ramus (usually due to cutting by the forceps) and more commonly at the sides of the rectum, behind, near the raphé. (5) Labor always ruptures the urogenital septum, tearing it in all directions and also from its ramifications with the endopelvic fascia, both above and below the levator ani. (6) The fascia between the

vagina and bladder is also stretched or torn, radially and in a downward direction, tearing the vagina and bladder off its anchorage to the upper surface of the endopelvic fascia over the levator ani and posterior surface of the pubis.

Thus it is evident that most of the damage resulting from labor is due to injury, rupture, distraction and displacement of the fascia, and less to tearing of the muscles.

Prevention, therefore, aims to preserve the fascia in its normal position throughout the parturient canal, and, where the overstretching or rupture can-

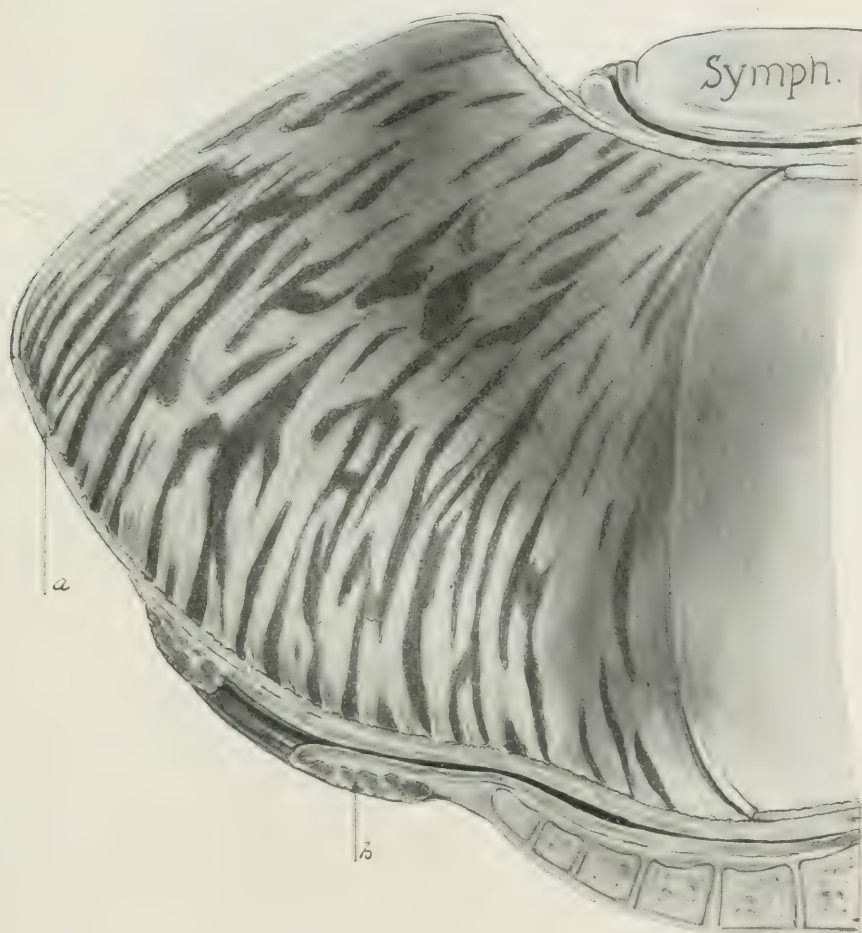


Fig. 2.—Purely diagrammatic, to show the interior layer of the levator ani fascia torn and distracted during the passage of the fetal head. *a*, Urogenital septum; *b*, sphincter ani.

not be avoided, to incise the structure at a spot where it can be repaired by suture.

We cannot do anything directly to save the pericervical connective tissues from radial and longitudinal overstretching and tears, but we can, indirectly, by avoiding all interference with the natural processes of dilatation of the cervix and restraining the natural powers if they are too violent. This means the avoidance of bags to hasten the dilatation, of manual stretching, of urging the



parturient to bear down before the head has passed the cervical barrier and especially avoiding pituitrin before complete opening of the cervix.

We can take direct action to save the fascial and muscular structures of the pelvic floor, in addition to practicing the measures just mentioned for preserving the connective tissues of the upper pelvis. By incising the fascia at its most vulnerable point, and reuniting it after delivery, we are almost always, not invariably, able to eliminate all damage to the pelvic floor.

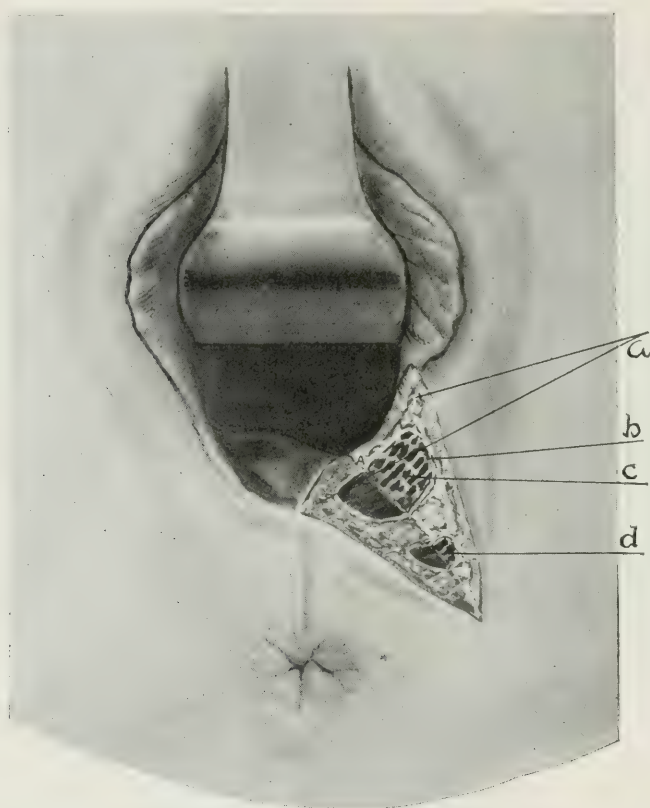


Fig. 3.—The perineotomy. Cut are the skin, the vagina, the urogenital septum, the outer layer of the levator ani fascia with its reflection over the deep transversus perinei muscle, the fascia over the levator ani both external and internal (the latter is called the fascia endopelvina). The portion of the fascia endopelvina between the levator ani pillars is called (by the author) the "intercolumnar fascia" and is shown at *A*. *a*, Urogenital septum; *b*, levator ani fascia; *c*, levator ani muscle or pillar; *d*, cut edge of deep transversus perinei muscle.

The first incision is through the skin and urogenital septum, exposing the pillar of the levator ani covered with the fascia endopelvina. Next the vagina is incised and with it the upper layer of the levator and fascia exposing the rectum, which is seen at the bottom of the wound covered with its fascia propria. Next the fibers of the fascia communicating with the urogenital septum are cut, which allows the perineal body with the sphincter ani and rectum to fall to the side opposite the cut. Simple episiotomy will not prevent injuries to the pelvic fascia. Where the disproportion between the head

and the pelvic floor is great, the muscular belly of the levator ani is also incised at a right angle to the length of the fibers. The models show these incisions better than descriptions.

Sometimes during the delivery the fascia tears and stretches more than we wish, but never so much that we lose the advantages of the preliminary incisions. By slow extraction we reduce this possibility very much. The repair is done with catgut, layer by layer, vagina, muscle, fascia, urogenital septum, subcutaneous fat and fascia and skin, all in anatomicosurgical fashion. Primary union is the rule and examination later shows that virginal conditions are usually restored.

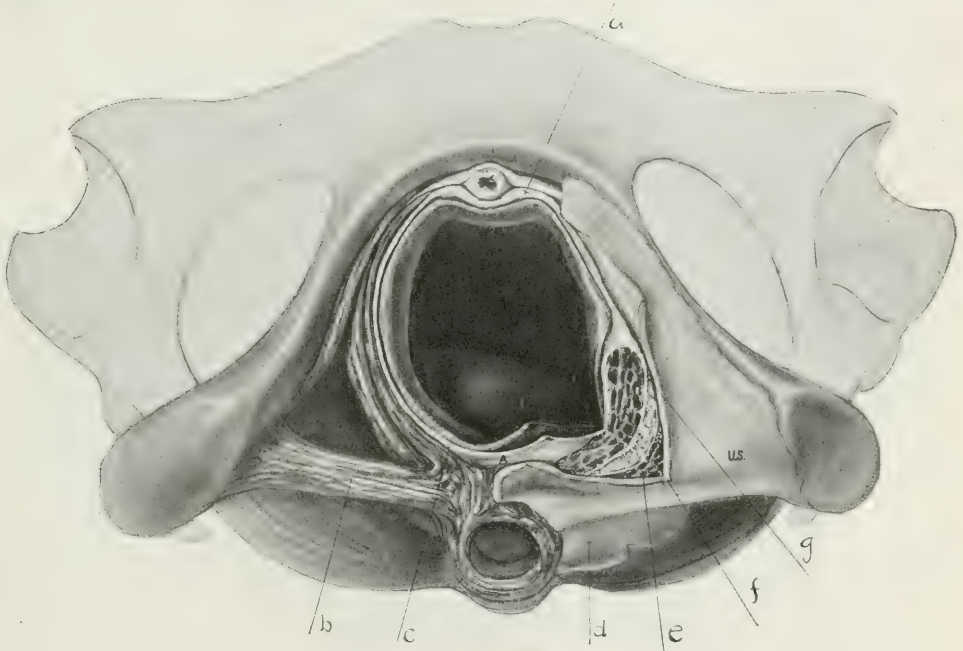


Fig. 4.—This model shows the dissection of the pelvic floor during the perineotomy. U. S., Urogenital septum; A, the intercolumnar portion of the endopelvic fascia as it fuses with the urogenital septum in the centrum tendineum of the perineal body. On the left, the urogenital septum has been removed leaving the deep transversus perinei (enlarged) and showing the fusion of the levator ani fasciæ with the rectum. a, Vesicovaginal fascia (its destruction leads to cystocele); b, musc. transversus perinei profund. (exaggerated); c, fascia endopelvina portion called "Intercolumnar"; d, external layer of levator ani fascia. Floor of ischiorectal fossa; e, cut edge of deep transversus perinei muscle; f, levator ani pillar incised, pubic portion; g, fascia of levator ani.

Now, should virginal conditions be restored? Did not Nature intend women should be dilated in the first labor so that subsequent children will come easily? Are not the lacerations normal?

Labor has been called, and still is believed by many to be, a normal function. It always strikes physicians as well as laymen as bizarre, to call labor an abnormal function, a disease, and yet it is a decidedly pathologic process. Everything, of course, depends on what we define as normal. If a woman falls on a pitchfork, and drives the handle through her perineum, we call that pathologic—abnormal, but if a large baby is driven through the pelvic floor, we say that it is natural, and therefore normal. If a baby were to have its head caught in a door very lightly, but enough to cause cerebral hemorrhage,

we would say that it is decidedly pathologic, but when a baby's head is crushed against a tight pelvic floor, and a hemorrhage in the brain kills it, we call this normal, at least we say that the function is natural, not pathogenic.

In both cases, the cause of the damage, the fall on the pitchfork, and the crushing of the door, is pathogenic, that is disease producing, and in the same sense labor is pathogenic, disease producing, and anything pathogenic is pathologic or abnormal.

Now you will say that the function of labor is normal, that only those cases which result in disease may be called abnormal. Granted, but how many labor

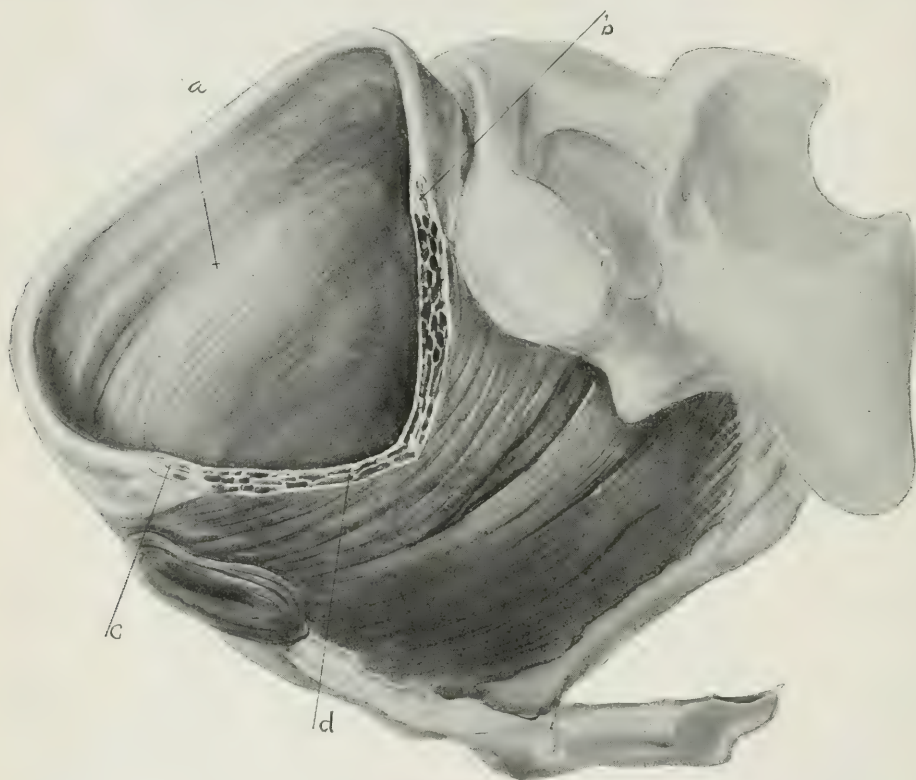


Fig. 5.—Condition of the muscles and fasciae at time of exit of head after a deep perineotomy has been made. Note the short perineum, the anus pushed to one side, the intact fascia over the levator ani. Partly diagrammatic. *a*, Fascia over levator ani not distracted or torn; *b*, urogenital septum not distracted; *c*, urogenital septum not distracted; *d*, levator ani pubic portion or "pillar" incised.

cases, measured by modern standards, may be so classified? Sir J. Y. Simpson, said that labor, in the intention of Nature should be normal, but that in a large proportion of cases it was not so. If the proportion was large in Simpson's days, during the middle of the last century, it amounts to a majority today. In fact, only a small minority of women escape damage during labor, while 4 per cent of the babies are killed and a large indeterminable number are more or less injured by the direct action of the natural process itself. So frequent are these bad effects, that I have often wondered whether Nature did not deliberately intend women should be used up in the process of reproduction, in a



manner analogous to that of the salmon, which dies after spawning? Perhaps laceration, prolapse and all the evils soon to be mentioned are, in fact, natural to labor and therefore normal, in the same way as the death of the mother salmon and the death of the male bee in copulation, are natural and normal. If you adopt this view, I have no ground to stand on, but, if you believe that a woman after delivery should be as healthy, as well, as anatomically perfect as she was before, and that the child should be undamaged, then you will have to agree with me that labor is pathogenic, because experience has proved such ideal results exceedingly rare.

What are the factors that render labor so pathogenic? Dangers, immediate and remote, threaten both mother and child throughout.

First, for the mother. Infection is always a threat, even under the most ideal conditions. Virulent streptococci inhabit a large percentage of vaginae, and if the second stage becomes too prolonged, if the bruising of the parts is too extensive, if the woman's resistance is worn down by too much suffering or by hemorrhage, they may invade the organism and prove fatal. The death may occur in a fashion that hides the cause from the unobservant accoucheur, e. g., a very mild sepsis, or even a single rise in temperature is shown, and, in the second week, death occurs from embolism.

Exhaustion is not infrequent in a second stage that may not be too long for a healthy woman, but in one whose nerve reserve is low, exhaustion may lead to immediate nervous shock, and later, pronounced neurasthenia. If the "twilight sleep" propaganda taught us anything, it showed the actual value of preserving the nervous strength of the parturient.

Of greatest importance, because of greatest frequency, is the damage to the pelvic floor and perineum; next comes the injury to the vesicovaginal fascia and then the lacerations of the cervix and the connective tissue supports of the uterus, the so-called uterine ligaments. It is not necessary before this society to enumerate the immediate and remote effects of this destruction of tissue.

The dangers of the second stage of labor to the child are much greater than one who has not studied the matter, may think. It may surprise some present to know that the following injuries have been caused by the forces of natural, spontaneous labor: fracture of the skull; rupture of the tentorium cerebelli; intracranial hemorrhage (numerous minute and large ones); retinal hemorrhage, abruptio retinae, dislocation of the lens; facial paralysis; Erb's paralysis; rupture of the sternocleidomastoid muscle, already diseased, resulting in wry neck; fractures of all the long bones of all the extremities; rupture of the cord; tearing of the cord from its abdominal attachment, etc.

The most common dangers, however, and therefore the most important are asphyxia from abruptio placenta or prolonged compression of the brain and intracranial hemorrhages. Brothers, of New York, found that 5 per cent of children died during labor. Holt and Babbitt, of New York, 4.4 per cent; Schultz, 5 per cent and 1.5 per cent in 24 hours from the trauma of labor, Kerness, of Munich, found 5.2 per cent and Potter, of Buffalo, had 4 per cent fetal mortality. A certain portion of these deaths occurs in natural, unassisted labor. How many babies are hurt and damaged in operative delivery cannot be determined, but their number is legion, and the same must be said of the

effects of natural labor. Any one who has thoughtfully studied the head of a child moulded by strong pains through the tight pelvis of a primipara will agree that the brain has been exposed to much injury. The long sausage-shaped head means that the brain has been dislocated, the overlapping bones indicate that the sinuses have been compressed with resulting cerebral congestion; the caput succedaneum evidences the pressure to which the brain was subjected. If there is a caput on the outside of the skull what of the inside? The punctate hemorrhages in the skin confirm the last-mentioned finding; the subconjunctival ecchymoses show us the possibility of hemorrhage in the retina. From outward visible evidences, therefore, we can deduce that the brain has suffered distortion, congestion, edema, compression and hemorrhages, but we need not rely on deduction alone. Clinically, if you listen continuously to the fetal heart tones, you will be convinced that the child is suffering, and autopsies bring the final proof of the above assertions. Neurologists for many years have pointed out the connection between epilepsy, idiocy, imbecility, cerebral palsies and prolonged hard labors. Observant obstetricians have known this for so long that it is an accepted fact. In 1917, Arthur Stein, of New York, reviewed the literature on the subject; he studied 5,562 cases in various homes for feeble-minded children, and comes to the conclusion given above. Indeed, although the statistics are meagre, they seem to show that instrumental delivery is safer than prolonged, hard, unassisted labor. Stein's article is well worth reading, as it quotes numerous accoucheurs and neurologists of scientific standing who support this view. One may well ask himself whether the brief and moderate compression of the head in a skillfully performed forceps operation, is not less dangerous to the integrity of the brain than the prolonged pounding and congestion it suffers from a hard spontaneous delivery. If a late forceps operation is done on a head and a brain already infiltrated with small hemorrhages, the results are worse, compounded.

Anoxemia (anaërosis, the beginning of asphyxia) of the child in the second stage is a not uncommon condition, but fortunately most children are born before the asphyxia becomes fatal. In the Chicago Lying-in Hospital, hardly a month goes by but that one or more infants die from this cause. Either the child is stillborn or dies a few minutes after birth, or dies within the week from atelectasis. Most so-called blue babies are simply atelectatic. The asphyxia may be primary—from separation of the placenta, pressure on the cord, tetanic action of the uterus, etc., or it may be secondary to cerebral compression or hemorrhage. Its beginning and progress may readily and easily be determined by means of the stethoscope, industriously applied during the second stage. Another result of asphyxia in labor is infection of the fetus. In gasping for air the child inspires vaginal mucus and later develops pneumonia or intestinal sepsis.

Among the late effects of prolonged labor on the child must be mentioned permanent disorders of the special senses, sight and hearing, due to hemorrhages into the nerve endings, the nerve itself, or its nuclei. Fetal deaths and all the complications are more frequent in primiparae, as would be expected, even if the statistics and the history of primogeniture did not bear out the truth of the statement.

If we review all these things and if we admit that they occur even in so-called normal labor, we ask ourselves, are we today doing all that our refined obstetric art permits, to prevent damage and avoid disease of both mother and child? In other words, shall we depart from our old trusty, time-honored "watchful expectancy," i. e., waiting for distinct signs of distress on the part of the mother or babe before interfering—or should we anticipate these dangers and, as a routine, make the first stage of labor less painful and shorter and eliminate the second stage by a surgical delivery.

For the first stage, as stated before, we can do nothing safely except give narcotics, recommended in the form of a modified twilight sleep—unless we perform Cesarean section. It is surprising to me to receive requests from women for this method of saving them from even the pain of this part of labor. The most radical apostle of early surgical delivery is Potter, of Buffalo. In all cases, as soon as the cervix is fully opened (and oftentimes before), he completes the preparation of the soft parts manually and performs podalic version followed by immediate extraction. This practice has, and in my judgment, justly, evoked a storm of disapproval. In Potter's hands (perhaps) the operation is safe, but in less skillful hands there will undoubtedly be a long train of dead and damaged babies, ruptured uteri, and torn soft parts. The same may be said, though with considerable less force, to what I recommend for the obstetric specialist—the operation of "prophylactic forceps."

The radical interference with the mechanism of the third stage is intended to reduce the amount of blood lost, shorten the anesthetic period and diminish the danger of infection from retained blood clots, membranes and insufficient uterine contraction.

Now the writer freely admits that this method of treating labor is a revolutionary departure from time-honored custom and must have really sound scientific basis for recommendation. This it has.

*First*, it saves the woman the debilitating effects of suffering in the first stage and the physical labor or a prolonged second stage, and in the nervous inefficient product of modern civilization, this is becoming more frequently necessary. The saving of blood already referred to, has much to do with the quick and smooth recoveries I have observed in my cases. In the combination with morphine and scopolamine in the first stage, gas or ether in the second stage, and operative delivery, we have robbed labor of most of its horrors and terrors, and we ought to thus favor the increase of the population.

*Second*. It undoubtedly preserves the integrity of the pelvic floor and introitus vulvæ and forestalls uterine prolapse, rupture of the vesicovaginal septum and the long train of sequelæ previously referred to. Virginal conditions are often restored.

*Third*. It saves the babies' brains from injuries and from the immediate and remote effects of prolonged compression. Incision in the soft parts not alone allows us to shorten the second stage, it also relieves the pressure on the brain and will reduce the amount of idiocy, epilepsy, etc. The easy and speedy delivery also prevents asphyxia, both its immediate effects and its remote influences on the early life of the infant.



There are three objections to the innovation and one is a real one, but it will be, let us hope, only temporary. Prophylactic forceps will be made an excuse by unskilled, conscienceless accoucheurs, for the hasty termination of labor, not in the interests of the mother or babe, but for their own selfish ends. I fear that there are already too many forceps operations, and therefore, I hesitated long before I decided to publish this method. But I have always felt that we must not bring the ideals of obstetrics down to the level of general, the occasional practitioner—we must bring the general practice of obstetrics up to the level of that of the specialist. Let us trust each man to do honestly according to his limitations. For the one, watchful expectancy, for the other, prophylactic forceps.

The other two objections are, the possibility of infection and the dangers to the child from an improperly performed forceps delivery, brain injury and compression of the cord. If the woman has an evident infection or if there is a suspicious leucorrhœa, the operation is contraindicated. In clean cases the matter of infection should not deter us. We practice a technic as painstaking as for laparotomy and have no fear of the results.

As for the forceps operation, in skillful hands the danger is *nil*. By means of the head stethoscope we are able to recognize danger to the infant from asphyxia and since the resistance of the soft parts is gone, there is no compression on the child's brain. We should not blame the operation for faults made in its performance.

The results of this new method of treating labor are all that one could wish for. As yet, no mother or baby has died; there has been no case of infection or cerebral hemorrhage. The babies have thriven, the mothers have not shown the exhaustion and anemia of former days. The restoration of the parturient canal has been always perfect—indeed, too nearly perfect. I have the impression that involution is quicker and more complete, that retroversion of the uterus is rarer, and all in all, the recovery much more rapid and satisfactory than with the older treatment.

## EXTRAPERITONEAL CESAREAN SECTION\*

BY JOHN A. MCGLINN, M.D., M.S., PHILADELPHIA, PA.

HAVING had considerable experience in the past twenty years with the Säger and Porro Cesarean section in clean and infected cases, with but two maternal deaths, both moribund eclamptics, it is natural that I should view the claims made for the so-called newer operations with a certain degree of skepticism. The operation of extraperitoneal Cesarean section, however, is not new. It is only a revival of an operation which has been advanced and abandoned several times in its century of existence.

Jörg first advanced the operation in 1807 and was followed by Ritgen who operated in his first case in 1821. The operation was not completed; profuse bleeding compelled him to abandon the attempt and resort to the classical Cesarean. The child died shortly after birth and the mother died two days later from hemorrhage. In 1822 Dr. Physick proposed a similar operation, based on anatomic studies, but the operation was never performed. There is a record of a similar operation being attempted in France in 1823, but this also had to be abandoned and the technic changed to the classical operation, on account of the difficulties encountered.

We can understand the crying need of such an operation during the period prior to aseptic surgery, when practically every case of the classical operation resulted fatally from infection, and yet the operation was apparently abandoned and we hear no more of it until 1870. In that year Dr. T. G. Thomas conceived the idea of extraperitoneal Cesarean section and performed the operation on the cadaver. He afterwards performed the operation on a woman dying of pneumonia in an effort to save the child which, however, died shortly after birth. In 1875 Dr. Skene performed the first successful operation. Other operations followed and Thomas was able to report a series of cases with four living babies and a maternal mortality of 40 per cent. Nicholson states there were reported fourteen such operations with a maternal mortality of 50 per cent and a fetal mortality of 42 per cent. In 1892 Thomas discarded the operation for the classical Cesarean section with aseptic technic.

With the advent of aseptic surgery the operation was again practically abandoned though Frank continued at work on the problem. He desired to perfect an operation which would be safer than the classical Cesarean section in the infected case or in the case that had been in labor a long time. In 1906 he proposed a transperitoneal operation with the isolation of the general peritoneal cavity by attaching the parietal to the visceral peritoneum. Between 1892 and 1906 very little mention of the subject is found in the literature, the supposition being that the operation was discarded in favor of the classical operation with aseptic technic.

Subsequent to 1906 many Continental surgeons proposed varied technics for the true extraperitoneal operation and some modifications of Frank's trans-

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peritoneal method. We find, however, no reference to the subject in British or American literature until Tweedy's paper in 1911 and Nicholson's masterly review in 1914. Although Tweedy's paper was a clarion call to the British surgeons to adopt the operation, I have been unable to find another reference in British literature since that date. There is also a paucity of papers in American literature during the past ten years. The war hardly explains this lack of interest as the Continental literature is full of references during the same period.

Recently there has been a reawakening of interest in this subject and we hear many discussions of the advantages of the newer operations, which are as old as the operation itself.

Extraperitoneal Cesarean section operations can be divided into two general types.

a. The true extraperitoneal in which the peritoneal cavity is not invaded at any stage of the operation. This operation will be referred to in this discussion as the extraperitoneal.

b. The transperitoneal in which the peritoneal cavity is opened and subsequently isolated by suturing the parietal and visceral peritoneum and the uterus opened in this artificial extraperitoneal space. This operation will be referred to in this discussion as the transperitoneal.

The advantages of the extraperitoneal operation over the classical Cesarean section were set forth by Tweedy in a paper published in 1911. Speaking of the classical operation he stated; "He (the operator) knows that to obtain good results the operation must be performed before or within a comparatively short time of the onset of labor; that the membranes should not be ruptured; that frequent vaginal examinations introduce an element of danger which may act as a positive contraindication to the operation. Above all he knows that the wound is liable to imperfect healing. As proof of this one need only point to the number of deaths that have occurred from rupture of the uterus in subsequent pregnancies; to the device of introducing adhesions between the uterine and abdominal wounds; and finally to the radical procedure of sterilization which insures against another pregnancy."

Referring to the advantages of the extraperitoneal operation: "If it is true that the newer operation can be performed safely and becomes easier when the woman is far advanced in labor with the membranes ruptured and the lower uterine segment greatly thinned out; that the incision through which the child is delivered involves such a comparatively unimportant and bloodless part of the uterus that its rupture in a subsequent pregnancy would be a matter of little significance; that for practical purposes the operation is extraperitoneal; that there is no possibility of the formation of adhesions to cause intestinal obstruction or incarceration of the uterus; that because of a pre-existing sepsis suppuration of the uterine wound does not necessarily mean general peritonitis, then surely the operation is worthy of greater consideration than it has yet received from British surgeons."

B. C. Hirst (1913) sums up the advantages as follows:

"*First*.—The mortality of an extraperitoneal section should be the minimum in both clean and infected cases.



"*Second.*—The uterine wound is in such a position that even if it should leak or become infected the result is not necessarily disastrous.

"*Third.*—There can be no intraperitoneal adhesions with an abnormally high position of the uterus as the least disagreeable consequence.

"*Fourth.*—The convalescence of the patient is much more comfortable in every way.

"*Fifth.*—The abdominal wound is stronger, less disfiguring, less likely to exhibit hernia.

"*Sixth.*—If the uterine wound should burst in a subsequent pregnancy or labor, the accident is not so dangerous as if the wound were intraperitoneal."

He goes on to say: "I am not, however, arguing so much for the adoption of the extraperitoneal section in infected cases, as for the deliberate selection as the best of operations in clean cases."

He also decries the difficulty of the operation as an argument against its general adoption and yet in the same year he perfected and advocated a transperitoneal operation which has not, as fully, the advantages of the extraperitoneal but which is shorn of the difficulties of the latter.

DeLee states: "Viewed from the most modern viewpoints, the classical Cesarean section leaves much to be desired. In the first place, it is not safe when infection is present or only suspected, therefore it cannot always be used to obviate craniotomy on the living child: second, postoperative intestinal complications are frequent, and while seldom fatal, are always disturbing; third, peritoneal adhesions are often left, causing suffering and trouble later; fourth, the uterine scar may rupture in a subsequent labor; fifth, there is still a mortality of one to two per cent and higher in just those cases where one would like to adopt this method of delivery."

The disadvantages of the classical Cesarean section may be summarized as follows:

1. In the nonelective case the maternal mortality is higher than in the elective case. The mortality increases with the length of labor prior to operation; the rupture of the membranes; the number of vaginal examinations, and the attempts at vaginal delivery. The mortality is dependent upon infection, frequently peritonitis.

2. The frequency of rupture of the uterus in the site of the scar in subsequent pregnancies and labors.

3. The formation of adhesions between the uterine and abdominal wounds.

4. The unsightly abdominal scar and the possibility of incisional hernia.

5. Postoperative intestinal complications.

The advantages of the two types of extraperitoneal operation may be summed up as follows:

1. The peritoneal cavity not being opened or isolated from the field of operation, the danger from infection is less and therefore are better operations in the infected or supposedly infected cases.

2. If the uterus ruptures in the site of the incision in subsequent pregnancies or labors it is an accident of no material consequence.

3. There is no danger from the formation of peritoneal adhesions.

4. The scar is not unsightly and the possibility of incisional hernia *nil*.

5. There are no postoperative intestinal complications.

6. Hemorrhage during the operation is slight.

*First.*—In order to debate the first of these disadvantages and advantages it will be necessary to discuss briefly the subject of puerperal infection. It will not be necessary to discuss sources of infection other than through the birth canal. It is accepted that infections of the birth canal are implanted from without and increase in frequency with the number of vaginal examinations, the length of labor, the rupture of the membranes and attempts at manipulative or instrumental delivery. Wound infections of the vagina are not germane to the subject. Infections may also be implanted in the uterus and the usual location is in the placental site. When infection gets into the uterus it may travel to the peritoneum through the lymphatics, the Fallopian tubes and in the case of Cesarean section through the uterine incision. It may extend into the pelvic cellular tissue, the body of the uterus, the pelvic veins, causing a thrombophlebitis, or into the blood stream causing a bacteriemia.

It must be admitted that the Sanger operation does not in any way combat infection in the frankly infected or potentially infected case. Further it increases the dangers by predisposing to general peritonitis both by the "spill" of the amniotic fluid and extension of infection through the uterine incision. The Sanger operation, followed by hysterectomy and the extraperitoneal treatment of the stump, fulfills every need while the infection is still limited to the uterus except for the "spill" during the operation.

To what extent does the extraperitoneal operation meet the indications to combat infection? Only in two ways, the "spill" from the uterus is extraperitoneal and if the uterine incision becomes infected, there is less danger of peritonitis provided the peritoneum has not been torn during operation, an accident which has frequently occurred. If infection occurs in the pelvic cellular tissue it is not so serious a matter as if it occurred in the peritoneum. This is true and yet patients die after pubiotomy from infections in this locality and as a matter of fact statistics show a mortality of 4 to 5 per cent from infection in the extraperitoneal cases. Some authors lay great stress on the advantage of drainage of the uterus through the uterine fistula by packing the uterine cavity with iodoform gauze and bringing one end out through the abdominal incision. Practically what advantage would this have over draining down hill instead of up hill by packing the uterus with gauze and bringing it out through the cervix? We have all learned how futile such treatment is. The extraperitoneal operation does nothing to combat infection if it is lodged in the placental site or has extended beyond it to any degree whatsoever.

The transperitoneal operation is even less efficient. I do not believe there is a method of attaching the parietal and visceral peritoneum that will absolutely prevent leakage of the "spill" into the peritoneal cavity. Again there is always the possibility that the attached peritoneum will be torn apart during the delivery of the child and the peritoneal cavity exposed. This has actually occurred in every case that I have witnessed, the intestines being seen in the upper angle of the incision. I feel sure that with proper technic the peritoneal cavity can be as effectually protected in the Sanger operation as in this operation.

If after delivery of the child the two layers of peritoneum are separated and attached to their position, there is little added protection against the spread of infection through the uterine incision other than that given by an infected peritoneum covering a more or less traumatized area of the uterus, for the peritoneum must be infected by the discharges passing over it and the uterus must be traumatized when its covering is detached.

If the "spill" from the uterus and infection of the incision were the only dangers to be met in the delayed or handled case then the extraperitoneal operations would practically solve every difficulty. They have no place in the frankly infected case any more than the Sanger operation has. When we elect the operation in the potentially infected case we are simply gambling on the presence and extent of infection.

Cragin in discussing the relative value of the two operations says: "That the classical operation of Sanger is a better operation in clean cases and that in infected cases the superiority of the extraperitoneal Cesarean section over the Sanger incision followed by hysterectomy after the removal of the child is still to be proved. Both the maternal and the fetal mortality of the Sanger Cesarean section at the Sloane Hospital are lower than those of the extraperitoneal Cesarean section as reported from Germany, hence the author feels justified in preferring the former."

Williams states: "As neither of these operations are available for use in infected patients, are more difficult to perform, and do not give better results than the classical Cesarean section, it is questionable whether they will permanently displace it after the novelty attending their employment has disappeared."

*Second.*—Sufficient cases of rupture of the uterus at the site of the uterine scar have been reported to make this a vital subject. To say, however, that if the rupture occurs in the lower uterine segment instead of the body of the uterus is an accident of no material consequence is a doubtful statement and not based on observed facts. The usual site of rupture of the uterus is in the lower uterine segment, just where the incision of the uterus is made in the transperitoneal section. In Lobenstine's thirty-seven cases of uterine rupture the mortality was 70 per cent. In Eversham's 140 cases the mortality was 45.8 per cent and in Seipiadēs' 97 cases it was 65.8 per cent. Why should rupture of the uterus in the lower uterine segment after Cesarean section show a smaller mortality than rupture at the same site without Cesarean and how in the light of these mortalities can it be regarded as an accident of no material consequence? As a matter of fact rupture of the uterus is an exceedingly dangerous condition no matter when, where, or how it occurs and no statement not backed by facts can prove it otherwise. It is yet to be proved that rupture of the uterus is less frequent after the transperitoneal operation than after the Sanger. Theoretically it should be more frequent.

*Third.*—There is no danger from the formation of peritoneal adhesions.

The formation of peritoneal adhesions in the Sanger operation is an unquestioned disadvantage of the method. This disadvantage is entirely eliminated in the extraperitoneal operation and practically entirely so in the transperitoneal.



*Fourth.*—The scar is not unsightly and the possibility of incisional hernia *nil*. This cannot be denied in the extraperitoneal operation when the Pfannenstiel or inguinal transverse incisions are used. Where the median or vertical lateral incision is used there is, of course, no difference between them and the ordinary incision for the Säger operation.

*Fifth.*—There are no postoperative intestinal complications. There is no question that in the extraperitoneal operation peritoneal insult is avoided and there is no danger of intestinal complications other than might follow a normal labor. In the transperitoneal operation, however, while the danger is less than after the Säger operation it is not entirely eliminated.

*Sixth.*—Hemorrhage during the operation is slight.

This may be true and many authors lay stress on this point, but it is not in accord with my observation or experience. Again many authors contravert this statement, giving hemorrhage as one of the disadvantages of the extraperitoneal operations. The operations which I have seen in this region have been bloody. During the war I had considerable experience with gun-shot injuries in the prevesical space and I found bleeding not only profuse but difficult to control. If complete hemostasis is not obtained infection is likely to follow in the deep cellular tissue. I recall one case of infection following injury in this region with death resulting from peritonitis when autopsy showed absolutely no injury to the peritoneum.

In the transperitoneal operation while bleeding may not be more profuse than in a Säger operation it is at times certainly more difficult to control. I recall seeing such an operation performed by one of our most skilled obstetric surgeons where the bleeding so obscured the field of operation that it took him ninety minutes to complete the operation while his average time for a Säger or Porro operation is twenty minutes.

While the extraperitoneal operations have certain admitted points of superiority they also have certain disadvantages.

*First.*—The extraperitoneal operation is unquestionably more difficult and time-consuming than the classical Cesarean. Some authors hold that this is not a just argument against the general adoption of the operation. They maintain that the surgeon should master the technic and he should not allow the difficulties of the procedure to prevent his performing an operation so vastly superior to the classical section. Logically these advocates should all perform the Dührssen-Sohn's operation, which, while the most difficult, is at the same time most truly extraperitoneal. The difficulty of the operation is a disadvantage. Skill can only be acquired on the living subject and the American surgeon hesitates to acquire skill at the price of the life of his patient. We see all through the history of the operation the tendency towards the simplification of technic and of late the advocacy of the less scientific but easier transperitoneal operation.

*Second.*—On account of the time it takes to perform it is not applicable in the rare case when speed is necessary to save the child.

*Third.*—There is danger of injury to the bladder and ureter. This accident has been referred to frequently in the literature.

*Fourth.*—It is not applicable in cases of placenta previa.

*Fifth.*—It has no place in the frankly infected case.

*Sixth.*—In clean cases where a positive indication for section exists it is not possible to repeat the same operation (extraperitoneal) in the majority of cases.

*Seventh.*—Mortality and morbidity of the operation. Latzko collected 150 cases with a general mortality of 7.3 per cent and a mortality from infection of 5.4 per cent. In Jeanin's 148 cases the general mortality was 7.45 per cent, while the mortality from infection was 3.04 per cent. In Lewis' 102 cases the maternal mortality was 8.8 per cent. In Latzko's and Jeanin's combined cases the morbidity was 30.7 per cent of which 25 per cent were due to infection.

In discussing this operation it is interesting to go back a few years and read what standard textbooks of obstetrics said of it.

Dorland in 1901 makes no mention of it.

Webster in 1903—"It should have no place in obstetric surgery at the present time."

Norris in 1903 gives nine lines to the subject. "The necessity for laparolytrotomy can scarcely be said to exist."

Hirst in 1899, speaks of laparolytrotomy as an operation that is no longer justifiable.

What is the status of the operation at the present time?

Theoretically in clean cases the extraperitoneal operation is the ideal operation, but its disadvantages overshadow its advantages. The transperitoneal operation is superior to the classical Cesarean section for the reason that the resulting adhesions are in a situation less likely to give trouble. The Beck operation is superior to the transperitoneal operation, as it has all the advantages of the former and none of its difficulties.

In the frankly infected cases the operations are contraindicated.

In the suspected cases the operations have a place. It is to be remembered that they only protect the peritoneum against infection from the spill of the amniotic fluid and extension of infection through the uterine incision. When they are selected instead of the Sanger incision followed by hysterectomy we are simply gambling with the extent and distribution of the infection. It must also be remembered in this connection that all cases of peritonitis following Cesarean section are not uterine in origin.

My own feeling is that the Beck operation with thorough protection of the peritoneal cavity and perfect peritonealization of the uterine incision is superior to the transperitoneal operation as a routine procedure. While theoretically it is not as efficient as the extraperitoneal method, practically, on account of the many disadvantages of the latter, it is the better operation.

In conclusion: The operation is over a century old. The same discussions that we are hearing now were heard in 1807, in 1827, in 1870, in 1906 and in 1913. There has hardly been a new thought advanced, pro or con, except variations in technic. The operation has never been generally accepted and it never will be. While it has many advantages they are overshadowed by its disadvantages.

It is a laudable object to perfect technic to reduce mortality, but our real problem is to so raise the standard of obstetric knowledge and practice as to make the operation unnecessary.

## CRANIAL AND INTRACRANIAL BIRTH INJURIES\*

BY HAROLD BAILEY, M.D., F.A.C.S., NEW YORK, N. Y.

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MANY are engaged in a movement which has for its object prenatal care. Maternity centers have been established in the larger cities and they are popular for their motive appeals to all classes. The basis of their work is a two-fold desire, the protection of the mother during her pregnancy and labor and the assurance that a healthy and normal child will be brought into the world.

If the report of the Health Department<sup>1</sup> for the week ending March 20, 1920 is examined, it will be found that of the total number of those born—living and stillbirths—there were 3.7 per cent born dead and of those living 3.8 per cent died within the first month. These figures combined, compare closely with the figures from the Johns Hopkins clinic<sup>2</sup> which show 7 per cent of infant deaths in 10,000 labors and with the Sloane Maternity<sup>3</sup> of 7.2 per cent in the same number of cases. The latter figures in both instances being compiled from the infant deaths from the seventh month of gestation to fourteen days after delivery.

In a series of 14,468 births, with a stillbirth rate of 3.6 per cent, J. C. Edgar<sup>4</sup> found that of the 341 cases in which the cause could be determined 110 or 32 per cent had obstructed or protracted labor. McQuarrie<sup>5</sup> in a small series found that the stillbirths were due in 37½ per cent of the cases to trauma.

In this paper I propose to call attention to the fact that a considerable proportion of stillbirths and early deaths are due to injury to the head of the infant and to suggest that in a few instances the lesions lend themselves to treatment that might lessen in some degree the early death rate and lower the morbidity in those infants that now survive.

Several of the earliest obstetricians recognized the significance of cranial injuries as a cause of stillbirth. Marceau in 1695 and Smellie in 1752 and Litzman in the latter part of the nineteenth century reported cases of depression and fracture of the skull in the parietal region. Rosinski,<sup>6</sup> in 1893, tabulated all the cases that he could find in the literature, which proved to be 38; and he added 5 cases of his own to the discussion of this subject.

As early as 1837 Evory Kennedy<sup>7</sup> called attention to the brain lesions, especially edema and hemorrhages, occurring in certain newborn and very young infants; and about 1851, Weber<sup>8</sup> and in 1853 Hecker<sup>9</sup> described in detail the meningeal and cortical injuries occurring at birth.

That some of these bleeding cases survived and suffered from the effects later in life was first made clear by Little.<sup>10</sup> In 1861 he read a paper before the London Obstetrical Society entitled: *On the Influence of Abnormal Parturition, Difficult Labors, Premature Birth and Asphyxia Neonatorum on the Mental and Physical Condition of the Child Especially in Relation to Deformities*. The full title of the paper is cited because it shows the manner of

\*Read at a meeting of the New York Obstetrical Society, April 13, 1920.



his explanations for the paraplegias and idiocy and other brain symptoms occurring later in childhood. He gives the birth history in some 50 cases and states that added to 200 cases that had applied at his hospital for orthopedic treatment there were a great many in idiot asylums over which he had no control. He found that some of the infants had been born by the breech, some were premature, and in others it had been difficult to start respirations. He laid great stress on the fact that asphyxia would considerably increase the pressure in the cortical veins and he believed sufficient to rupture them especially in the premature. Correlated with the autopsy findings that he mentioned in his paper, he entirely established the connection between brain hemorrhage at birth and infantile spinal paralysis, now often called Little's disease.

In 1885 Sara J. McNutt<sup>11</sup> collected 10 cases of autopsies on infants dying within 5 days of birth and with the obstetric history showed that intracranial hemorrhage was a considerable factor in producing mortality in the first days of life. Her contribution is very important for the following reasons: It established in a group of cases the pathologic picture and from the point of etiology completes Little's paper. Evidence was produced that delivery by the breech might be accompanied by bleeding over the vertex as it occurred in three of her cases. Finally, the collection of such a group now assumes importance for in each of these ten cases time enough existed between birth and death for surgical intervention to have taken place and perhaps offers evidence to us some thirty-five years later, that we must move in that direction.

In 1892, Herbert Spencer<sup>12</sup> found in 130 autopsies in the newborn, 53 or 40.7 per cent had cerebral hemorrhage. Archibald<sup>13</sup> in 1909 found 43 per cent of 74 cases with intermeningeal hemorrhage. Warwick<sup>14</sup> in 1919 showed 50 per cent of hemorrhages in 36 deaths in infants stillborn or dying early; and our own series shows 40 per cent in 100 cases in which the skull was opened.

Assuming that the literature offers proof that cerebral injuries are not infrequent, we may turn to those papers which deal with treatment.

Kerr<sup>15</sup> mentions the report of Boissard of a case trephined in 1877. This is the first decompression operation on the newborn. It was performed for fracture of the parietal bone with intracranial pressure symptoms, and it was a success.

In 1901, Kerr<sup>16</sup> suggested a method of treatment for the spoon-shaped depressions occurring in the frontal and parietal regions. The skull was squeezed in the longitudinal direction, thus increasing it in the lateral dimension and perhaps at the same time producing more pressure within. He mentions three successes by this method. As a surgical procedure it is illogical, for the danger from such an injury is intracranial pressure and hemorrhage, and the depression may be accompanied by fracture—conditions that would not be helped by further increase of pressure within the skull.

Cushing<sup>17</sup> in 1905, advocated the adoption of the same principles of treatment in the cerebral bleeding of the newborn that are made use of in the adult. He reported four cases with definite symptoms in which he decompressed the skull by a large osteoplastic flap, which was turned back in the parietal region. Two of the cases recovered and two died. The history of these babies together with the two autopsy reports forms a foundation for future work in this subject.

Tweedy<sup>18</sup> in 1908, advised the treatment which was in vogue in the Dublin Maternity for the depressions occurring about the coronal suture. Apparently his advice is meant to apply only to those depressions which occur without immediate symptoms of intracranial pressure. He makes an incision over the dent and boring through the bone with the end of a vulsellum forceps, inserts the sharp end under the bone and pulls it up, thus reinverting it. Kosmak<sup>30</sup> has recently devised an instrument for use in this procedure.

#### ANATOMIC AND OBSTETRIC CONSIDERATIONS

Little made it clear that some of the children showing lesions attributed to injuries at birth were breech presentations, and that there were other factors beside head pressure in difficult labors. He pointed out that vessels in the cortex and other parts of the body are especially fragile and quoted Weber and Hecker as testifying to the frequency of minute hemorrhages in other organs besides the brain in stillborn infants. The congestion from asphyxia alone he believed was enough to rupture cortical vessels in full term children.

It is a fact noted by many that these stillbirths have hemorrhages in other viscera. Neglecting the explanation of congestion, Gr  en<sup>19</sup> and also Warwick stated their belief that these cases represented deaths from a condition identical with that known in the first week as "hemorrhage of the newborn." This explanation is not in accord with our theories concerning the disease and it seems a little far-fetched, when in nearly all of these cases there is an asphyxia that dams back the blood in the veins and increases the pressure to an extent that would produce exudation.

Cushing agrees with Little that asphyxia neonatorum may lead to rupture of the cerebral vessels, just as it sometimes occurs in asphyxia from the spasms of whooping cough. McNutt's three breech cases with cerebral hemorrhage had the extravasation only over the vertex. While this is a significant fact as regards asphyxia, of course it is not conclusive, for the bleeding in this position might be due to concussion from the contact of the head with the pelvic bones in rapid withdrawal.

In hemorrhages occurring in the small and premature, we must recall that the cranial bones are poorly developed and that there are wide gaps at the suture lines. On first thought it would seem that there was little probability of cortical hemorrhage, for the cavity is more distensible; however with these bones loosely joined they are more easily made to overlap and thus cut the veins leading to the longitudinal or lateral sinuses, or even to injure the sinuses themselves. Virchow first pointed out that the veins of the cortex have little support as they enter the sinuses. Cushing also dilates on this anatomic condition. If these veins are unprotected for even a minute distance as they empty their current into the larger channels, it is evident that they may very easily be ruptured by marked moulding of the head.

In cases where the pelvis is flattened, the symphysis being 5 cm. deep in front and the sacrum 12 cm. in the back, the head cannot advance uniformly through the cavity. Usually the anterior parietal advances while the posterior bone is retarded. As a consequence the lower anterior bone moulds over the

one on the opposite side that is engaged against the sacrum. If the posterior bone advances first, the moulding becomes extreme. Edgar<sup>20</sup> says: "Presentation by the posterior parietal bone is serious because the head is wedged on the symphysis pubis. \* \* \* Great pressure is exerted on the posterior bone by the sacrum, causing a depression in the bone. Sometimes this depression is spoon-shaped. It is quite likely that the brain has been injured." (Fig. 1.)

The sharp edges of the bones undercut the vein tendrils as they enter the sinus on the opposite side of the midline. Such a hemorrhage would be subdural, but might by dissection become subarachnoidal and circulate with the cerebrospinal fluid over the medulla and into the cord. As so many of the autopsies show blood in these places, it seems probable that this accident due to synelitim and moulding, in a flat pelvis, is not infrequent.

Fracture of the skull producing hemorrhage usually means the rupture

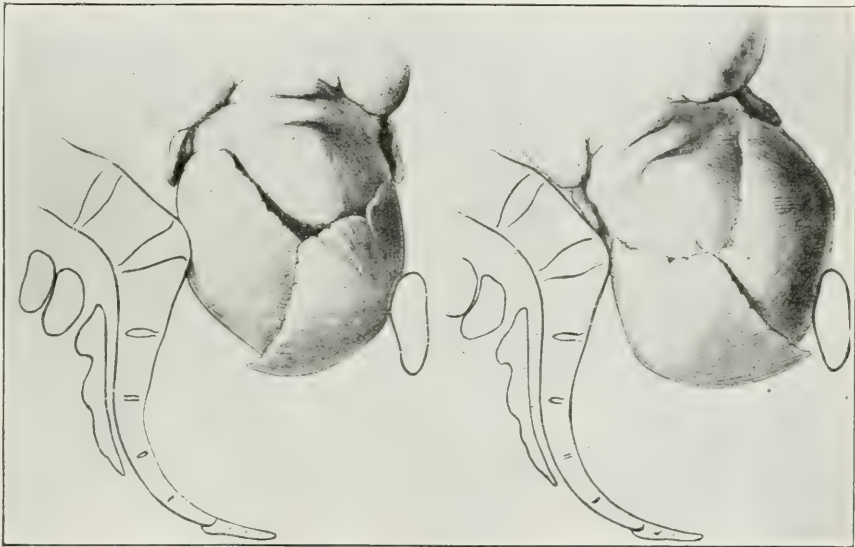


Fig. 1.—Synelitim with overlapping of the parietal bones. Apt to occur in flat pelvis and may lead to rupture of the cortical veins as they enter the longitudinal sinus. (From Bumm, *Grundriss zum Studium der Geburtshilfe*.)

of a meningeal vessel. This condition seems to be rare, perhaps because of the loose attachment of the dura to the bone in the newborn. Poor application of the forceps or brutal force are the two conditions that might give rise to a crushing lesion such as is pictured by Rosinski. Of course, the close locking of the blades and traction against an obstacle would cause the parietal bones to overlap and the hemorrhage might be produced as outlined above.

The bleeding from the surface of the cortex is often held beneath the pia and may produce considerable damage even when it is of slight extent, if it is located near the cortical centers. (Figs. 2 and 3.)

Hemorrhage into the ventricles may occur from rupture of the chorioid plexus. It occasionally occurs without bleeding elsewhere in the brain. It was present in one of our cases, where the delivery was by Cesarean section, and Osler found it in a case of an unborn child of a woman dead from typhoid.



In Spencer's series there were 15 children delivered by the forceps. Of 12 that were alive when the forceps were applied, there were 11 that had intermeningeal hemorrhage and one with intercerebral bleeding. Twenty of his 53 cases were delivered by breech extraction, and there were 13 that were normal vertex presentations.

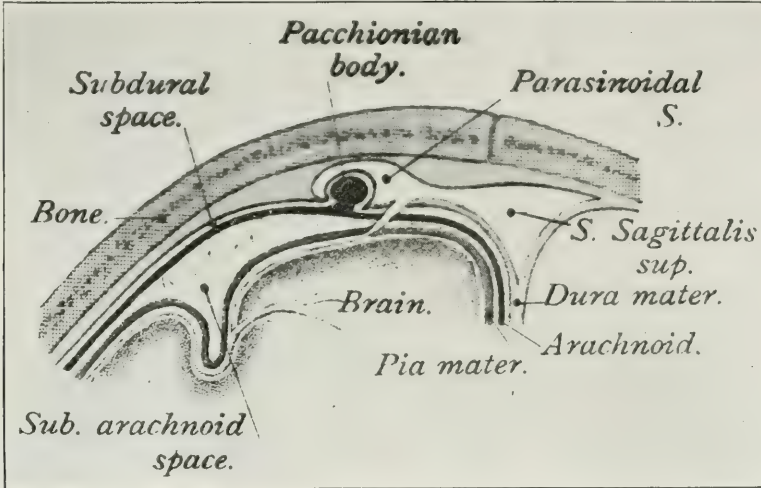


Fig. 2.—To show the subarachnoid space where the bleeding often occurs. (From J. Ryland Whitaker: *Anatomy of the Brain and Spinal Cord.*)

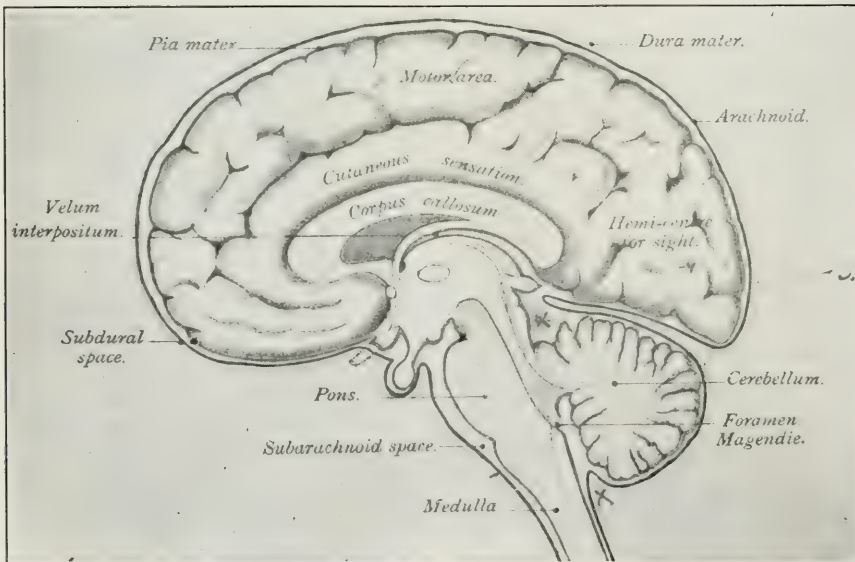


Fig. 3.—To show the relationship of the arachnoid at the base of the brain and to indicate the location where considerable blood may collect beneath the tentorium. (From J. Ryland Whitaker: *Anatomy of the Brain and Spinal Cord.*)

Margaret Warwick's series of 18 cases from the University of Minnesota Hospital are very accurately described. They are particularly interesting because 16 were born alive and of these, 12 were normal births with spontaneous

TABLE I  
CLASSIFICATION OF FORTY CASES OF CEREBRAL HEMORRHAGE  
AUTOPSIES FROM THE MANHATTAN MATERNITY HOSPITAL

FORCEPS DELIVERIES						
HOSP.T. NO.	STILL BIRTH	AGE AT DEATH	LOCATION	HEMORRHAGE IN VISCERA	ASPHYX-IA	NOTES
62	*		Cerebral	.....	yes	Median
98	*		Diffuse	Liver, lungs	yes	High
106	*		Diffuse over cortex and in Vent.		yes	High
111	*		Diffuse over cortex	Punctate lungs,	yes	.....
193	*		Over temporal region	lungs, heart, kidney,	yes	.....
198		36 hrs.	Over vert. Occip. and frontal	viscera, punctate	yes	.....
219	*		Diffuse in pia: marked over cerebellum	thymus, heart, lung	yes	.....
250		5 days	Extra and subdural and cerebellar	.....		High
251	*		Dural right side	.....	yes	Median
BREECH DELIVERIES						
67	*		Diffuse cerebral	.....	yes	Version
74	*		Diffuse cerebral	.....	yes	
78	*		Diffuse Marked occip. lobe	.....	yes	
99	*		Diffuse over entire cortex	.....	yes	
102	*		Diffuse meningeal	lungs, thymus	yes	
134	*		Over both temp. lobes	.....	yes	Premature
192	*		Multiple base and in pia	viscera	yes	
152	*		Occipital region	viscera	yes	
93	*		Diffuse in pia	.....	yes	Version
141	*		Cerebral multiple	.....	yes	Version
151		14 hrs.	Epidural over parietal.			
			Diffuse in parietal lobe	viscera		Version
NORMAL DELIVERIES						
64		20 min.	Diffuse over cortex	Punctate viscera		Dry labor
88	*		Diffuse cerebral	Punctate lungs	yes	
101		2 days	Diffuse cerebral	.....		
117		1 day	Diffuse in pia	heart, thymus		Premature
126	*		Diffuse cerebral	lung, thymus	yes	
133	*		Diffuse in cortex	.....	yes	Premature
158	*		Diffuse, rupt. long. sinus	lungs, liver, etc.		Macerated
171	*		Diffuse, espec. right parietal	.....		
175	*		Meninges and ventricles	.....		Syphilis
196	*		Lateral ventricle	Punctate viscera	yes	Dry labor
191		4 days	Diffuse over occip. and parietal	" both lungs		Precipitate
181		36 hrs.	Diffuse. Thrombosis sinuses	in mucous memb.		
200	*		Diffuse, pia-arachnoid	viscera	yes	
223		3 days	Diffuse, espec. over parietal	punctate lungs		
215	*		Diffuse, espec. occip. region		yes	
234	*		Diffuse pia-arachnoid	lungs, liver	yes	
236		3 hrs.	Diffuse pia-arachnoid espec. over r. occip. parietal	lungs, thymus		
CESAREAN SECTION						
66	*		Both lateral ventricles		yes	
DELIVERY NOT KNOWN						
162	*		Hemorrhage in cerebellum	punctate lungs		
231	*		Diffuse parietal	viscera	yes	

establishment of respiration. There was only one infant delivered by forceps. Six of the hemorrhages were over one hemisphere. This finding upholds Cushing's belief that the hemorrhage is frequently limited to one side. There were 7 cases with the bleeding over the cerebrum and cerebellum and one case had, in addition, bleeding into the ventricles. There were two cases that had only dural bleeding and 2 with bleeding into the ventricles only.

In reviewing the Manhattan Maternity autopsy records in the last 185 autopsies, there were 100 in which the skull was opened and definite mention made of the findings. Of the 85 in which the head was not opened, 35 were so macerated or poorly preserved that it was deemed futile to proceed, and of the remainder it was apparently considered unnecessary to examine the brain because of such gross abnormalities found in other organs.

In 100 cases, dating from 1914, there were 40 cases with cerebral hemorrhage. There were but 10 that were not stillborn. One case lived 20 minutes, one 30 minutes, one three hours, and the others from 14 hours to 4 days. It is of note that of the babies that lived only 2 were forceps deliveries. Two were premature and 5 were normal births. In the entire series 9 were forceps, 11 were breech extractions, five of these being preceded by version; one was a Cesarean and 17 were normal deliveries. There were 2 cases in which the histories could not be found.

The hemorrhage in 18 cases was described as diffuse, and I think in most instances this meant over the cerebrum; 11 were noted as being especially marked under one bone; 2 were diffuse and in the ventricles, 2 were in the ventricles alone; 1 was a diffuse meningeal hemorrhage with thrombosis of the sinus; 2 were in the cerebellum; 2 were in the pia and 2 were in the dura.

#### A REPORT OF FIVE RECENT CASES OF CRANIAL AND INTRACRANIAL INJURY

CASE 1.—Female child of B. K., born on the Bellevue service Oct. 5, 1919. The mother had a flat pelvis and had been in labor two days when brought to the hospital. Forceps had been applied to the floating head. A version and breech extraction was performed and the operator was assisted by the house-surgeon pushing the head into the pelvis from above. The delivery proved to be remarkably easy and the child passed through the pelvis with great rapidity. On delivery a marked depression, of the spoon-shaped variety, was present in the left parietal bone, a little in front of and above the eminence. There were no signs of intracranial injury. As this depression was almost over the center of the Rolandic area, where scarring or injury would almost certainly be followed by paralysis, it was decided to elevate the bone. Eight hours after delivery an incision was made for a distance of 5 cm. directly over the dent, and the pericranium was incised. With the sharp end of a vulsellum forceps, by a drilling action a hole was bored in the bone. There was some compression of the cranial contents, for the dura was in close contact with the bone and it was punctured. Clear fluid came out under pressure. The hook was inserted under the bone and on lifting, the bone assumed its normal shape at once with a spring-like action. The pericranium was repaired with catgut and the skin with silkworm-gut. The baby showed no reaction and was normal until the fifth day when the skin wound broke down. The resulting wound was washed out daily and became at once a clean granulating surface. About this time a series of infections occurred in the nursery and later caused the death of a number of infants from a specific organism—the *Streptococcus hemolyticus*. On



the eleventh day, when the wound was nearly healed, the baby had a rise of temperature and died on the fourteenth day after delivery. On the day of its death a blood culture showed the organism mentioned. (Fig. 4.)

CASE 2.—Infant of N. B., born on the Bellevue service Oct. 18, 1919. The baby presented in left occiput posterior position and was delivered by forceps using the Scanzoni procedure. As the head reached the outlet there was some difficulty in securing rotation. On delivery the left frontal bone had a spoon-shaped depression. Although there were no signs of intracranial injury the depression was raised by the method of Tweedy as described above. The wound healed by primary intention and the child gained weight in the usual manner. It was discharged with its mother on the tenth day.



Fig. 4.—Spoon-shaped depression in the left parietal bone produced by contact of the promontory of the sacrum with the after-coming head in breech delivery. (Drawing.)



Fig. 5.—Spoon-shaped depression of the left frontal bone produced by contact with the spine of the ischium in instrumental rotation of a head deep on the pelvis. (Drawing.)

As to the seriousness of spoon-shaped and other dents of the skull, the only available statistics except for occasional cases are those of Schroeder.<sup>21</sup> In 65 cases 34 per cent were stillborn, 15 per cent died and 50 per cent remained alive. In cases of meningeal injury the symptoms, being mainly those of increased pressure, are frequently delayed and in some instances do not appear until the second or third day. Case 4 will serve to illustrate this point. (Fig. 5.)

CASE 3.—Intracranial injury. Male child of J. M., born on the Manhattan Maternity service March 1, 1920. Weight at birth 9 pounds 8 ounces. Forceps were applied for an anterior position of the occiput well engaged in the pelvis. The procedure was difficult, and even after the birth of the head the shoulder delivery was delayed and considerable traction was made on the neck of the child. Respirations were started by the Prochonik method of resuscitation. The child's face became swollen on the right side but the infant was sent to the ward without evidence of any other injury. In the morning some 12 hours later, it was found that there was a right facial and a right arm paralysis. The baby did not cry and could not be made to cry although its respirations were normal. It could not swallow or nurse and fluid placed in its throat with a dropper returned at once through the mouth. There was marked tension in the fontanelle. There was a slight groove-shaped depression on the posterior part of the left parietal bone above the eminence.

While at first glance it seemed that the child had a peripheral facial paralysis and an Erb's arm palsy, the above symptoms indicated that there was decided intracranial pressure. On close observation it was seen that the eye of the child remained closed and although there was some swelling of the upper part of the face it seemed as if this paralysis was due to a cortical lesion. The reflexes of the arm were not only present, but they were exaggerated. This was markedly so of the supinator reflex. The legs were not affected so far as could be determined.

The case was seen in consultation with Dr. A. M. Wright and he verified the above findings. He stated his belief that the skull should be opened to

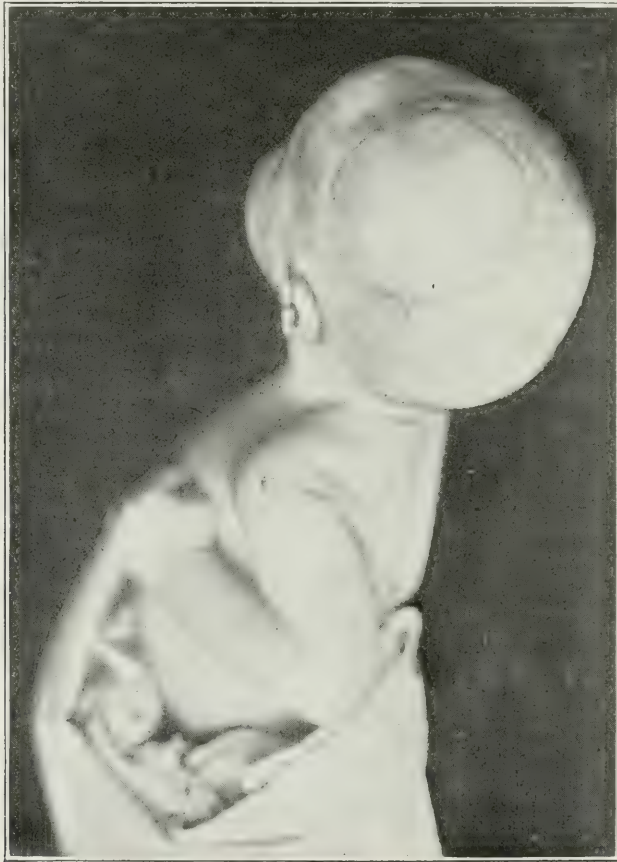


Fig. 6.—Operative site, after healing.

relieve the symptoms of intracranial pressure, and he felt that the focal symptoms present pointed to a hemorrhage in the middle of the left Rolandic area.

The cranium was opened by a large osteoplastic flap of the left parietal bone. The depression in the bone was disregarded and the angle of the Rolandic area was laid out by folding a paper to  $67\frac{1}{2}^{\circ}$  and marked on the shaved skull. Hemorrhage was controlled by a catheter tied around the head just above the eyes. In making the incision into the bone the knife entered the coronal suture and punctured the dura. Great difficulty was encountered in cutting the bone with scissors, as the blades would separate. After a considerable opening had been made the bone was lifted and the remainder of the bone incision was comparatively easy. In about the center of the dura, then

exposed, there was a dark area. The dura was incised and at once there was a decided hernia of the brain, the cortex rising well above the bone. About the middle of the exposed area and as far as could be judged at the center of the fissure of Rolando there was a clot about 2 by 3 cm. lying directly over the cortex. This was washed with warm saline. The question arose as to the necessity for decompressing the opposite side in order to reduce the hernia. Irrigation with the warm salt solution and the equalization of the pressure gradually caused the brain to recede somewhat. The dura could not be united so the entire flap was replaced and the skin and pericranium were brought into apposition with many silkworm-gut stitches. The posterior and upper



Fig. 7.—Twenty-five days after operation. Note the raised area in the skull, the facial paralysis still remaining and the typical arm position.

portion of the flap was well above the level of the rest of the bone. The infant had only a small amount of ether by the drop method.

The child was fed by gavage, and after a few days the greater part of the facial paralysis cleared, he cried normally, and was able to nurse. Gradually some motion and strength was evidenced in the flexor group of muscles of the forearm, which later became spastic. The child lost over a pound in weight during the first days, but gradually gained a little. The wound healed by primary intention except for one stitch from which a little clear serum exuded on the tenth day. This healed promptly. (Fig. 6.)



The picture presented (Fig. 7) was taken on the twenty-fifth day after operation. At discharge on the thirtieth day, the upper arm showed a typical paralysis of the Erb type with all reflexes absent. On crying, the drooping of the right angle of the mouth showed that the facial paralysis had not entirely cleared.

The weight of the child was stationary at 8 pounds, 5 ounces, and it was necessary to put it on a formula, as the mother had but little milk.

There was a hard scar-like induration in the sternomastoid muscle of the left side. This induration was first apparent about 20 days after birth. The child will be followed carefully to watch its development. (Figs. 6 and 7.)

CASE 4.—Illustrating spoon-shaped depression with fracture and intracranial injury. Infant McC., born at the Manhattan Maternity, February, 1920. This case was delivered by the forceps for an occiput posterior position. At birth there was some flattening of the right parietal bone, but this was obscured within an hour by a well marked pericranial hemorrhage of the type known as cephalhematoma. The baby had a sighing type of respiration and could not swallow or nurse. On the second day it had tense fontanelle and a peculiar weak cry, which is common with cerebral irritation. There were no localizing paralysis, but on the fourth day it developed convulsions and died on the following day. Autopsy showed a fracture beneath the spoon-shaped dent with rupture of a small branch of the middle meningeal. There was also subarachnoidal bleeding and some blood beneath the tentorium.

This case is very interesting, for if it had been operated by the method of Tweedy, as were the first two cases in this series, it would not have been helped. Here it was evidently necessary to decompress the skull to relieve the pressure. This case antedated Case 3 in which the decompression was done, and the study of its history and autopsy findings opened our minds to the necessity for action.

CASE 5.—Infant McA., stillborn on the Manhattan service March 14, 1920. The head advanced to midpelvis in a right posterior position and then forceps were applied. At birth the child did not breathe, but the heart beat strongly for 20 minutes. The usual methods of resuscitation were not successful in starting respirations. On autopsy there was found a hemorrhage within the dura of considerable extent that had found its way over the temporal and posterior fossæ, and some blood was also found on the right side and beneath the tentorium cerebelli. There was no subarachnoidal or cortical hemorrhage.

This case is cited because it is so typical of forceps trauma and gives rise to speculation as to the advantages to be gained from rapid decompression through the coronal suture line while respiratory efforts are continued by means of mechanical apparatus.

#### SUMMARY AND CONCLUSION

The results from decompression operations of the large osteoplastic flap type are not good. Cushing<sup>22</sup> operated nine cases with but four successes. With the exception of our case all other cases have been fatal. Taylor<sup>23</sup> reported 2; Seitz,<sup>24</sup> 1 (?); 2 by F. T. Murphy<sup>25</sup> and one each by Ballock<sup>26</sup> and Hubbard.<sup>27</sup> There are, however, four successful cases of decompression by another method. Simmons described a method patterned after that used by Boissard for lifting the bone in dents about the coronal suture. The coronal suture line is incised one and one-half inches from the midline and the dura opened for  $\frac{3}{4}$  of an inch and a rubber tissue drain inserted. Two such operations were done by Simmons,<sup>28</sup> one by F. T. Murphy and one by Green.<sup>29</sup> There

are no others recorded. There are two theoretical disadvantages: The opening of the suture line is apt to be accompanied by hemorrhage and injury to the brain substance, for the dura is intimately connected with the bone at this location. The drainage is not apt to be good, for the bones close together and effectually stop the opening. A subtemporal opening would seem to have the same advantages here as exist in the openings in older children. The Tweedy procedure without lifting a button of bone to ascertain what injury lies beneath is a makeshift as our Case 4 would demonstrate.

There is a large field for investigation and constructive work in the care of the newborn presenting meningeal symptoms. Before anything may be done for the stillborn child with the pulsating heart, a great deal of educational work must intervene. However, it seems that (as Meare and Taylor indicated) any method of resuscitation that notably increases the pressure in the cerebral veins, and those are the very methods that most of us use, should be discontinued. Mechanical respiratory apparatus, which we can trust to deliver air and withdraw the carbon dioxide, must be developed.

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# Society Transactions

AMERICAN GYNECOLOGICAL SOCIETY. FORTY-FIFTH ANNUAL  
MEETING HELD IN CHICAGO, ILL., MAY 24, 25 and 26, 1920

THE PRESIDENT, DR. ROBERT L. DICKINSON, OF NEW YORK, IN THE CHAIR.

DR. EDWARD P. DAVIS, of Philadelphia, read a paper on **Analgesia and Anesthesia in Labor.**

Dr. Davis said that the commercial exploitation of so-called "twilight sleep" first drew the attention of the public to this subject. When the true value of this method was appreciated and it was relegated to its proper place in obstetrics the attention of the profession was engaged by the advocates of nitrous oxide and oxygen in labor. It was claimed that no patient should pass through labor without a thorough and painstaking effort upon the part of her medical attendant to relieve suffering and avoid exhaustion. This claim must be acknowledged just and fair, but in the effort adequately to meet it discrimination should be exercised.

That actual suffering occurs during labor and that this suffering is the same as that endured during surgical procedures accompanying wounds and lacerations or under other conditions where nerve filament are irritated, there can be no doubt. The effort to consider suffering in labor as righteous and inevitable was dissipated by Queen Victoria. It will be remembered that when Simpson proposed to give her chloroform in labor the bishops of her church forbade because pain was decreed in Scripture as the necessary accompaniment of childbirth. The Queen replied that none of the bishops had ever had a baby, but that she had passed through this experience and that her experience should decide, and so it did. She was among the first to receive the benefits of anesthesia in labor.

The best cure for the abnormalities of the first stage of labor lies in the hygiene of pregnancy. If a woman can be brought to labor with sound nerves and muscles a great gain has been made. If she can be under the care of an experienced nurse and has the natural maternal ambition and instincts, the first stage of labor may often be passed successfully without the use of drugs. The copious and thorough irrigation of the lower bowel will do something to mitigate nagging pain. The frequent emptying of the bladder, the necessary preparation for labor, moving about and occupation, will all help to pass daylight hours. The healthy woman may doze during the first stage of labor at night but very often she is unable to sleep and failure of sleep is a good preparation for exhaustion. In many cases analgesia is therefore demanded and its proper administration is of great value. It can be said that the woman will be prepared for labor in proportion as she has avoided toxemia in her pregnancy and has practiced well-regulated exercise in the open air. With this background, if sleep is denied her during the first stage, she rightly demands relief. It is evident that the merit of the so-called "twilight sleep" lay in the psychic control of the patient and in the hypodermatic use of morphine. While the former is difficult at times outside of a hospital, the hypodermatic use of morphine, preferably with atropine, is usually possible. With unruptured membranes there is little evidence that this injures the fetus nor does it seriously delay labor. In the presence of nausea a drug hypodermatically given is promptly and efficiently absorbed. It tends to promote dilatation of the cervix, and the combination is a reliable and efficient one. The proven objections to scopolamine or hyoscyne are the uncertainty of action which may become exciting and its uncertain influence upon the fetus. In our experience a moderate dose of morphine and atropine has never acted unfavorably upon the child. In one case of excessive nervousness with tedious dilatation of the os and cervix in a neurotic multipara suffering with a mild bronchitis, the hypodermatic use of



codein through two nights and three days seemed to produce a condition of mild asphyxia in the child. This, however, did not prove serious and the child was readily made to breathe. In cases where patients are admitted to the hospital threatened with rupture of the uterus through impacted fetus and violent uterine contractions, the hypodermatic use of morphine may be necessary until operation can be performed. We have as yet seen no positive evidence that morphine thus used injured the child.

During the second stage of labor we believe that an opportunity should be given for the patient to establish the normal physiology of the expulsive operation of parturition. This consists in muscular contraction which after reaching the crest of its energy, is followed by a gradual cessation and relaxation, and this to be succeeded by a period of absolute rest and often sleep. If the pulse and pulse tension of the patient undergoing this phenomenon be observed, they are found to be surprisingly normal. There is no evidence of exhaustion and it is questionable whether it is well to seriously disturb this condition by anesthesia. There can be no objection to brief anesthesia at the point of greatest muscular activity, provided the conditions are such that the patient, if it were necessary, could be promptly delivered. If, however, the conditions are unfavorable for prompt delivery through the vagina, the patient may insist upon anesthesia and abandon all efforts to help herself in labor.

Pressure upon the pelvic floor is painful in proportion to the lack of development of the genital tract, the size and consistence of the presenting part, its position and presentation, and the condition of the nervous system of the patient. Unquestionably at this stage of labor anesthesia should be available and usually employed. Here those who urge the use of nitrous oxide and oxygen believe it to be a specific. Our experience, however, has not led us to subscribe to this somewhat enthusiastic claim. In our experience nitrous oxide and oxygen is not a stimulant, but is an anesthetic and asphyxiating agent. Its merit consists in its easy inhalation, its comparative safety, and the prompt recovery of the patient. It does not lessen the vigor of uterine contraction, neither does it seriously affect the fetus, nor is it a stimulus of muscular and nervous action. In some patients it produces a condition of excitement which is undesirable and it cannot be trusted if the anesthesia is to be carried to the surgical degree for forceps, version, or embryotomy. With a preliminary hypodermatic injection of morphine it may be used for abdominal section. While the apparatus necessary for its administration is comparatively simple, it is more cumbersome and complex than the can of ether and the gauze or simple inhaler necessary for etherization. While we recognize fully the value of nitrous oxygen in labor, we should not be willing to keep a patient under its influence continuously for five or six hours, neither should we be willing to depend entirely upon it in all cases of parturition.

The best quality of ether skillfully administered is successful in the majority of cases of spontaneous labor during the second stage. If given at the height of the pain, quickly removed so soon as the pain subsides, it stimulates and does not retard labor, but the moment when expulsion occurs, a few deep inhalations without air will render the patient insensible to pain, although capable of comprehending sensations of feeling, of hearing, or often of sight. The mother rouses easily after delivery and requires no anesthesia while the placenta is separating. For the insertion of stitches immediately after labor ether, with oxygen, properly administered, is comparatively safe and efficient. We have seen no evidence that such use during the stage of expulsion injures the fetus. It is true that ether is inflammable, that some patients are excited by it, that it is irritable to the bronchial tubes and kidneys, and that it is difficult to anesthetize some patients with ether, but if skillfully administered it is usually successful and its combination with oxygen renders it in our experience the safest of obstetric anesthetics. For the immediate closure of lacerations it must be remembered that all parts of the genital tract are not equally sensitive.

The comparative merits of nitrous oxide-oxygen and ether and oxygen were exemplified to the author in a recent experience. A multipara was suffering from a hepatic toxemia; while her urine remained comparatively free from albumin and casts, the ammonia percentage was rising steadily and likewise the creatine, creatinine and rest nitrogen. Vomiting was incessant and uncontrollable; the heart action increased in rapidity. As viability had been

reached it was deemed necessary to induce labor and it was suggested that to anesthetize the patient with nitrous oxide and oxygen would be useful. A careful physical examination of the patient revealed the fact that the second sound of the heart had disappeared, and that the heart was acting badly. There was no asphyxia, but cardiac dilatation seemed threatened. The anesthetizer wisely declined to use nitrous oxide and oxygen, stating that in his experience a similar patient had suddenly died during the administration of the nitrous oxide and oxygen while preparations were made to induce labor. Ether and oxygen were then given and labor was induced. After two hours of ineffectual pain with continued vomiting and bad heart action it was believed imperative to deliver the patient. Accordingly, ether and oxygen were again administered, dilatation of the cervix was completed by the gloved hand, and the child delivered alive by forceps. The action of the heart improved under the anesthetic and with the aid of vigorous stimulation hypodermatically the patient recovered from her labor. It seemed to us that in this case we were practically limited to ether and oxygen. Chloroform was prohibited by the hepatic toxemia present and also by the condition of the heart.

In the experience of the writer the combination of oxygen and ether proved remarkably successful in parturient women suffering from cardiac, respiratory or nephritic conditions which formerly demanded the use of chloroform. The writer recently had occasion to operate upon a number of pregnant tuberculous women in various stages of pulmonary tuberculosis, and employed this anesthetic with little irritation and good after-results.

For the purposes of diagnosis, nitrous oxide and oxygen may be exceedingly valuable. For thorough examination of nervous patients, for minor manipulations, such as the introduction of bag or bougies, or the introduction or removal of gauze packing, or the opening of a breast abscess, or for other possible conditions where a brief and not complete anesthesia is necessary, nitrous oxide and oxygen may be of great value. In inducing labor the writer is accustomed to employ these agents, thus enabling him to dilate the cervix somewhat, with the gloved hand, to separate the membranes from the lower portion of the uterus, and to introduce from one to three bougies without resistance and suffering upon the part of the patient.

For the obstetrician analgesia or anesthesia, skillfully given, makes for more accurate diagnosis during labor and for the successful management not only of spontaneous and normal parturition, but of complicated conditions.

#### DISCUSSION

DR. CARL HENRY DAVIS, MILWAUKEE, WISCONSIN.--Dr. Davis' paper strikes a conservative note. Dr. Davis and I agree fully in all but one particular. So far as the value of analgesia and anesthesia in obstetrics is concerned, my opinion regarding the relative merits of inhalation anesthetics in obstetrics is the same today as stated in 1917 in the three papers read that year before the Chicago Gynecological Society, the American Association of Anesthetists, and the American Medical Association.\* My conclusions may be found in those three papers as published.

My early experience in obstetrical anesthesia and analgesia was largely with chloroform and ether. Nitrous oxide-oxygen was rarely used except when other anesthetic agents were contraindicated. I have used no chloroform since 1909. I have tried ether in every manner suggested. During the past few years I have used nitrous oxide-oxygen analgesia as a routine in obstetrics. The results with ether, whether given by drop method or vaporized with air or oxygen, were in no way comparable with those usually obtained with the nitrous oxide-oxygen analgesia. With Dr. Davis I agree that nitrous oxide-oxygen should not be given continually for a long period. I first called attention to the possible dangers of the long-continued analgesia in 1917. But given intermittently, it has a distinct value over ether in most cases because it is quickly absorbed and quickly eliminated. Ether is very slowly eliminated. It has cumulative effects on mother and child. It weakens the uterine contractions and frequently causes nausea and vomiting. When the first few whiffs of ether are given to an obstetrical patient we substitute something which may be worse to her than pain, but

\*Am. Jour. Obst., 1917, lxxvi, No. 4; Am. Jour. Surg., 1917, xxi, Anesth. Suppl., p. 98; Surg., Gynec. and Obst., 1918, xxvi, 170.

given at the culmination of the contraction it usually surprises and quiets the woman. After a few inhalations she gets the cumulative effect and a definite relief of pain.

Ether, unlike chloroform, stimulates both respiration and circulation. A patient taking ether with air never has cyanosis from the ether and, since it does not reduce the amount of oxygen in the circulating blood, I fail to understand why ether given with oxygen can be so much safer in cases of toxemia than ether given with air. Oxygen with ether does not change the physiology or lessen the irritation to the kidneys. The safety of both ether and chloroform may be increased by the administration of alkalies before delivery and after.

Recently I have been using nitrous oxide-oxygen analgesia intermittently for mid- and low forceps deliveries as well as in normal labor. The nitrous oxide-oxygen is given to a deep analgesia or light anesthesia while the forceps are applied. The mask is then removed and thereafter the gas administered intermittently as in normal labor. The patient is instructed to bear down during contractions while gentle traction is made on the forceps. For primiparæ I do a primary posterior episiotomy. There is usually an easy delivery with a minimum of traction pressure on the head. I cannot accomplish this cooperative type of delivery with ether regardless of its administration. In my experience nitrous oxide-oxygen has proved to be the most satisfactory inhalation analgesic for both normal and operative obstetrics. If a long continued anesthesia is required, I use ether.

DR. W. FRANCIS B. WAKEFIELD, SAN FRANCISCO, CALIFORNIA.—I have striven for the last five or six years in San Francisco to relieve women of the pain of childbirth. I have used scopolamine anesthesia in all my private patients and up to the present these number 700 cases. I have no clinical practice in obstetrics, so that scopolamine is used entirely on the higher class of women of the city. I have found scopolamine as an anesthetic an absolutely perfect therapeutic agent and it is discouraging to a man who has used it as honestly and as faithfully as I have done with such gratifying results, to have men like Dr. Davis, Dr. Williams, and others relegate this thing to the background as a perfectly useless therapeutic agent.

I do not know why it is that the use of scopolamine has been unsuccessful in the hands of so many men. I believe it is because of bad preparations of the drug that have been used. Scopolamine, except in fresh solutions from the original crystals that have been carefully preserved from disintegration, or in the form of ampules, is useless.

In tablet form I consider scopolamine almost useless as an anesthetic and often injurious, because exposure of the scopolamine crystals to air will injure its therapeutic action and produce a wild delirium instead of a somnolent effect.

There is nothing psychic about my use of scopolamine. The patient is under more or less profound anesthesia from the time labor pains become regular until the child is born. No other anesthetic is used at all in labor except during the last half or dozen pains, when nitrous oxide and oxygen are used in conjunction. My patients go through labor without any reaction, without any pain whatever, and I consider a therapeutic agent that will produce this result without harm to the mother or child worthy of consideration and should not be carelessly relegated to the background.

The *San Francisco Examiner* not very long ago published an article in which Dr. Williams was credited with saying that it (scopolamine) had been tried and found wanting. Now, that may be perfectly true of Dr. Williams' experience with it, still it gives a bad impression to the general public and undoes very largely the work of others who have had great success with the use of this drug. Scopolamine, properly used, with proper preparation of the drug, is a valuable therapeutic agent.

DR. CHARLES E. PADDOCK, CHICAGO (BY INVITATION).—I would like to ask Dr. Wakefield some questions. He states that he uses scopolamine-morphine. He tells us that he has had 700 cases. Does he mean that he has used it in every case? When does he begin the use of it, at what stage in labor, and what are the dosages that he gives? Does he give it regardless of pain and has he had any asphyxiated babies? Can he use scopolamine-morphine without an additional anesthetic?

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—As usual, Dr. Davis has presented a conservative paper, but I do not think it is fair for him to condemn morphine and scopolamine, though his caution regarding the indiscriminate use of these anesthetics is well taken.



There is no doubt in the minds of all obstetricians that anesthesia in labor is a necessary adjunct. In order to give our patients the test of labor it is necessary to relieve some of their suffering,—particularly is this true in the nervous type of women with whom most of us are dealing. We can do this better with a combination of scopolamine and morphine than with morphine and atropine. The effect depends on how we use it and when we use it. In our clinic it is a routine first stage procedure. We do not try to get amnesia except in a limited number of instances. But we get some degree of analgesia and the analgesia holds over so that these patients, during the dilatation stage, enjoy the full action of their uterine muscles and can complete the second stage mechanism which Dr. Davis says is so necessary. When the fetal head reaches the pelvic floor and during the perineal stage anesthesia is again necessary, whether the delivery be accomplished by episiotomy, prophylactic forceps, or by nature. During this period we have found after a considerable experience with nitrous oxide-oxygen, that ether with oxygen is the safest and best anesthetic.

One point in closing is, that we discontinue the anesthetic after the delivery of the child and allow the patient to come out from her anesthesia before any reparative work is done. This allows the uterus to contract and minimizes the bleeding. When retraction is firm anesthesia is continued for the repair of pelvic injuries.

We have not had any postpartum hemorrhages since we divorced the anesthesia of labor from the anesthesia of repair. I trust I make myself clear on this point.

DR. JOSEPH L. BAER, CHICAGO (BY INVITATION).—I should like to subscribe almost without reservation to the views of the essayist.

My first experience with nitrous oxide anesthesia dates back to 1904, at which time, as a member of the house staff of the Michael Reese Hospital, I was sent to Wesley Hospital to watch Dr. Weller Van Hook do perineal prostatectomies under nitrous oxide. We then started to use it at the Michael Reese Hospital and for several years I was official anesthetist, during which time I gave many hundreds of nitrous oxide anesthetics for abdominal surgery.

In obstetrics I believe the only place for nitrous oxide-oxygen is in the second stage of labor before the end, and only with such women as cannot be controlled by the presence of the accoucheur who is cooperating with his patient during her second stage contractions. My view is, if the accoucheur is with his patient and steadies her, so to speak, she will be very much better and will usually choose to do without anesthesia during the second stage until near the end, at which time I rather prefer ether to nitrous oxide. The patient is usually controllable under light ether anesthesia for the purpose of actual delivery and is not always controllable under the nitrous oxide-oxygen.

During the first stage I use almost entirely, if I use any combinations, morphine hypodermically and chloral hydrate by mouth or rectum.

A word as to scopolamine. When "twilight sleep" swept over the country we at the Michael Reese Hospital decided to give it a thorough trial. My article published in 1915 dealt with a series of 70 cases. It was for us a conclusive answer and we have discarded its use in obstetrics.

DR. BENJAMIN P. WATSON, TORONTO, CANADA.—I think one of the very important things which Dr. Davis told us in his paper was that we should be particularly careful of the patient during her pregnancy. If one can see a patient frequently during the course of pregnancy and gain her confidence and be with her for some time at the commencement of labor, one can do a great deal to help that patient in her labor and stave off the administration of any anesthetic for some time at any rate. On the other hand, there are patients to whom one must administer some form of anesthetic in the first stages of labor.

I am entirely in accord with those speakers who have upheld the use of scopolamine and morphine. We use it frequently, but never before giving the patient a chance to go through the first stage without an anesthetic. I think it is a mistake to administer drugs as a routine when a certain stage of dilatation of the cervix has been reached, but if the patient is getting worn out, is fretful, and not bearing pain well, morphine and scopolamine or the hydrobromate of hyosine are valuable drugs. It has been my experience that with a preliminary dose of 1/6 gr. of morphine and 1/150 gr. hyosine hydrobromate there is no bad effect on the mother or child. The morphine is not repeated and if the hyosine hydrobro-

mate is repeated, it should be given in from 1/300 to 1/400 gr. dose. With that administration we usually have to give some general anesthetic toward the end of the second stage. We have used both nitrous oxide and oxygen and ether, and personally I trust to the administration of ether toward the end of the second stage of labor. I have seen no bad effects from morphine-hyosine administered in the manner I have mentioned.

DR. RALPH H. POMEROY, BROOKLYN, NEW YORK.—It seems to me, this society must recognize from the nature of the paper and the discussions that we are not dealing with a fixed and standard process of drug administration for the relief of the distress of labor.

In order to meet the psychology of satisfaction on the part of the patient, the obstetrician must be convinced that when she is through with her labor "she has not had a terrible experience." If we meet that requirement at all, we must recognize the fact that there is no fixed order of the administration of these analgesic and anesthetic drugs which can be standardized. Furthermore, we must understand that labors cannot be standardized and that we must have equipment, knowledge, and experience to apply to the variations of labor, the variations of temperament, and the adaptation of our knowledge and equipment to the psychology of satisfaction for that patient. Any organization or hospital equipment, or any teaching staff that does not recognize the usefulness of various combinations of morphine, scopolamine, nitrous oxide gas, ether, chloroform, worked out with reference to the individual case, fails to appreciate the importance of this subject.

DR. E. P. DAVIS (closing the discussion).—May I suggest to Dr. Carl H. Davis that in his last statement relative to analgesia and nitrous oxide-oxygen in low forceps he introduced an entirely different topic, which will be discussed by Dr. De Lee in a later paper.

Have we come to the point in obstetric science where natural spontaneous labor is not to be expected and should we substitute an artificial, more or less surgical, procedure for every parturition? If so, then nitrous oxide-oxygen anesthesia and low forceps is a surgical procedure, and the anesthesia is only a small part of it, and Dr. Davis has gone a little further than my paper went. I have nothing to say on that point except to bring up the question, are we going now to consider sharply that position?

As regards scopolamine which is used by our member from San Francisco (Dr. Wakefield), I was very much interested in hearing his experience. Most of us are not so situated that we can obtain absolutely pure drugs in this part of the world, and the importance of furnishing absolutely pure drugs was shown by the German government and the German manufacturers who instituted propaganda during the flowery days of scopolamine to give it by the mouth.

After hearing the discussion it is evident that there is a psychologic interest exercised by the gentleman upon his patients, which I envy him.

Regarding the remarks of Dr. Polak, it is always interesting to have him come out with something which seems good to him. It strengthens me. I think he is right in what he has said about labor and repair. They are not the same thing and hence anesthesia should be different.

Dr. Baer in his conservatism comforts me also, and I am glad to find that even in the stimulating atmosphere of Canada, Dr. Watson finds ether is a good anesthetic for women in parturition.

As regards Dr. Pomeroy's remarks, he touched on a very important thing. After all a woman in labor is approaching a supreme physiologic test and the damage to her being is psychologic. She is at present the psychologic entity of modern civilization. She cannot be considered *en masse*. There is no standardization, and hence we must approach the patient with the idea of helping her the best we can.

I leave seriously with you this one thing. I did not see that patient who died just as labor was being induced under nitrous oxide-oxygen. It was not my case. This woman had been given stimulation. She had been vomiting for some time. She was prepared for the induction of labor by stimulating her heart. It is the experience of anesthetists that a stimulated heart yields rapidly and fatally to nitrous oxide-oxygen. I may warn you therefore that if you attempt to anesthetize patients with nitrous oxide-oxygen who have been toxie and to whom it is necessary to give stimulation, you may have collapse. She died under inhalation of the gas without the uterus being touched. It was such a warning that I have taken the liberty of bringing it before you.

DR. BENJAMIN P. WATSON, of Toronto, Canada, read a paper entitled **Induction of Labor; Indications and Methods, with Special Reference to the Use of Pituitary Extract.**

Dr. Watson said: The communication is based upon 150 cases from the public wards of the Toronto General Hospital under my care and from my private practice. In these, labor was induced on the following indications:

Pregnancy toxemia .....	38
Pregnancy prolonged beyond calculated term.....	65
Small pelvis .....	25
Large size of head.....	10
Pulmonary tuberculosis .....	3
Dead fetus .....	3
Heart disease .....	1
Glycosuria .....	1
Anemia .....	1
Placenta previa .....	2
Hydramnion .....	1
Total .....	150

The fact that a patient has gone beyond the calculated date is not evidence that the child is postmature, and is not in itself an indication for the induction of labor. In arriving at the average we are dealing with cases with a possible variation of three weeks and every now and again we are bound to have cases at either extreme. It is, nevertheless, our duty to watch carefully all patients who go over the calculated term and to examine for the purpose of ascertaining the size of the fetal head in relation to the pelvic brim. At the first indication of any disproportion labor ought to be induced. This will be indicated in a primipara by nonengagement of the head or, by a head previously deeply engaged in the brim tending to become more mobile; and in a multipara by difficulty in pushing the head down into the brim. Multiparae who have previously had large children and hard labor should not be allowed to go beyond the calculated date.

*Small Pelvis.*—Pelvimetry ought to be routine in obstetrical practice. Every woman who engages a doctor for her confinement is entitled to expect that he will satisfy himself by actual measurement that she has a pelvis of an average size. This measurement ought to be made by the seventh month, so that if the pelvis be found to be small the advisability of the induction of premature labor may be considered.

*Pregnancy Toxemia.*—Systematic urine examinations and estimation of blood pressure afford early opportunity for the detection of pregnancy toxemia and when discovered early it is usually easy to treat. In a small proportion of cases improvement does not result and in them induction of labor may be indicated in the hope of averting an actual eclampsia. The indications of immediate danger are a high and rising blood pressure (140 or over), small excretion of albumin laden urine, the persistence of headache or failing vision. Persistence of all or any of these in spite of appropriate treatment, calls for the termination of the pregnancy.

Labor has been induced in these 150 cases by bougies, bag, quinine, pituitary extract, and quinine and pituitary extract. As the indications for the induction of labor have become more numerous of late years, and the wisdom of it has become apparent in a large number of cases, so we have felt that nonmechanical means which expose the patient to no added risk from manipulation and sepsis ought to be employed if they are in any way effective. There are two drugs which have a marked effect in stimulating uterine contraction, and stimulating it in a manner which very nearly approaches the intermittent activity characteristic of normal labor. Those two drugs are quinine and pituitary extract. This action of quinine has been known for a very long time and it has been used in small doses for the purpose of stimulating uterine contraction during labor. Of late years it has also been extensively employed in large doses for the purpose of inducing labor. The results obtained



have been somewhat varied. This has depended upon the time in pregnancy at which it was sought to induce the labor and upon the mode of administration. We have found that much better results are obtained when the quinine is given in solution than when it is given in the powder form. We employ the hydrochloride of quinine and administer along with each 10 grains, 10 minims of dilute hydrochloric acid. This seems to increase the solubility and the rapidity of absorption. In the ordinary routine the patient first takes 1 ounce of castor oil, this is followed in two hours by 10 grains of quinine in the above solution. This dose is repeated at two hour intervals until 30 grains are taken.

The use of pituitary extract in obstetric practice is of much more recent date. In 1913 I published a paper reviewing the literature, and there pointed out that Blair Bell in 1909 was the first to employ in practice the results of experimental investigations carried out with the extract of the pituitary gland up to that time. Since then a great mass of literature has accumulated on the subject. It is universally recognized that it is a most valuable agent for accelerating the second stage of labor when delay is due to feeble uterine contraction. In most of the articles which have appeared the reader is warned against using it for the induction of labor or before the cervix is fully dilated. We have used it extensively for the induction of labor and during all stages of labor and have never had any bad results. In 1913 I recorded three cases in which I had successfully induced labor by this means. One of those was at the eighth month, one at full term, and one at three weeks *post term*. I stated then that the method was worth an extended trial and I think that my later results bear this out. The procedure used is to begin with a dose of  $\frac{1}{2}$  to 1 c.c. administered intramuscularly with a long needle. In most cases uterine contractions commence in about ten minutes and increase in severity during the next twenty minutes. At the end of this time the second injection of  $\frac{1}{2}$  c.c. is given. If after a time the contractions tend to weaken, or to come at longer intervals, the dose is repeated. As many as six or eight doses may thus be given at intervals of about one-half hour. The important point is to administer a further dose before the effects of the previous one have entirely passed off. The effects from a single dose appear only to last for about one-half hour and there is no cumulative effect. Sufficient doses must therefore be given to keep up uterine contractions sufficient to produce a certain amount of opening up of the cervix. When the cervix has begun to open and the membranes to bulge into it the uterine contractions will continue without the further administration of the drug. The failures which we had in the beginning were the result of not pushing the dosage far enough. We have found it perfectly safe to give 8 or 10  $\frac{1}{2}$  c.c. doses at half-hour intervals.

Rather a curious point comes out here, that in 19 multiparæ the average was 19 hours, as contrasted with 18 hours as an average in 18 primiparæ.

With the bag method the average time elapsing before labor began was 13 hours and the average duration of labor was 10 hours. This number, of course, is very small and not sufficient to draw conclusions from.

With quinine alone, in 25 cases the average time elapsing from the last dose to the definite onset of labor was 7 hours, while the average duration of labor was 9 hours, 7 for multiparæ and 11 for primiparæ.

With pituitrin alone in a total of 18 cases the average time elapsing between the first dose and the definite onset of labor was 2 hours. The average duration of labor was 10 hours, 16 hours for 5 primiparæ and 9 hours for 13 multiparæ.

With quinine and pituitary extract, in a total of 62 cases, 53 were successful; 9 were totally unsuccessful. Six of the successful cases required repetition of the routine before labor began. In the 53 successful cases the average time elapsing between the first dose of pituitrin and the onset of labor was 2 hours and the average duration of labor 10 hours: 14 hours for 23 primiparæ and 7 hours for 30 multiparæ.

Recently two of my colleagues, members of my staff, J. G. Gallie and W. A. Scott, have recorded a series of cases (65) in which they used pituitary extract alone for the induction of labor. Out of this total 55 were entirely successful. The average number of doses given was 3, the average duration of labor was 7 hours. There was one fetal death 28 hours after delivery from atelectasis. The delivery was normal in 45, by forceps in 9, and by version in 1.

Taking these results along with the ones which I have recorded, I think we must recognize that the method has a definite place in obstetric practice and should be considered before other methods are adopted. It has very special advantages in cases of slight disparity between the head and pelvis, as it does not in any way prejudice the Cesarean operation should it prove to be necessary; an argument which cannot apply to the bougie or bag method.

DR. CHARLES B. REED, of Chicago, Ill., read by invitation, a paper entitled **Induction of Labor at Term.** (For original article see page 24.)

#### DISCUSSION ON PAPERS OF DRS. WATSON AND REED

DR. RALPH H. POMEROY, BROOKLYN, NEW YORK.—I cannot personally accept the general proposition that induction of labor slightly before, at, or after maturity, adds in any important way to the safety of the mother or child. I believe there is added a certain amount of danger to the mother, especially so in primiparæ, if induction is carried out by foreign bodies introduced into the uterus.

The second paper gave me no enlightenment as to a point from which to start discussion, owing to the fact that it made no distinction between the statistics in multiparæ and primiparæ. I have no more knowledge than the rest of you as to exactly why or when labor begins. I do know two factors that are necessary for the progress of labor after it has begun; one, that the ovum must be detached or easily detachable in whole or in part, and second, that the uterus must make intermittent contractions resulting in retraction adapted to a diminishing capacity of content. Unless the ovum is detached it cannot descend. If the uterine content cannot descend there develops with persistent labor some degree of spastic retraction of the uterus instead of progressive retraction of that organ. I abandoned the idea many years ago that you can induce labor necessarily by dilating the cervix when I was experimenting with dilating bags in the endeavor to shorten the first stage. I found by many experiments that forced dilatation of the cervix, notably as in multiparæ, did not necessarily induce labor.

For several years past I have been trying to manage all labors without using induction at all.

If we are logical and correct in our belief that there is real danger in making vaginal examinations in labor in the first stage, if we accept the proposition that rectal touch is of real value in cutting down the dangers of contact infection carried from the vulva up to the cervix or cervical glands, if we admit that vaginal examinations add something to the risk of infection, we must admit also that we should try to manage labors without putting a foreign body in the cervix, which, in remaining there obstructs drainage, and causes traumatism and contusion. One can induce labor in a healthy multipara, who has no real disproportion, with comparative safety and certainty by merely rupturing the membranes. If I must put a foreign body in the uterus, I prefer to use a bougie of some form, because it can be managed so it does not block drainage from the cervix.

I hope that Dr. Watson has discovered a process by which we can safely and promptly induce labor without cervix contact in the few cases in which we wish to empty the uterus forthwith. But at the present time, if the call is for an empty uterus at once, I prefer to cut below if the child is nonviable and above if it is viable.

DR. GEORGE W. KOSMAK, NEW YORK CITY.—A great deal of very valuable material is presented in the two papers of Dr. Watson and Dr. Reed and I do not feel like taking the pessimistic attitude on this subject of my predecessor in the discussion. It seems to me, as we develop our experience, we are guided more or less in what we do for our patients by what that experience has taught us. I have for a number of years carefully watched my patients with the idea that if they went on to what was accepted to be the normal end of their pregnancy, labor be induced. Nothing that has been said against this attitude has convinced me that I have been wrong. I feel like agreeing with Dr. Reed that it is a procedure we must always bear in mind but apply it to our patients individually rather than as

a routine procedure. I do not want to be understood as advocating the induction of labor at term as a routine, but every one of our patients should be watched, particularly primiparae, and if we have had the opportunity of making repeated antepartum examinations, I think we can feel rather certain as to when the child is large enough. In my own experience it has never happened in any case which I had under observation that a premature baby resulted from this method.

I do not feel I can quite agree with Dr. Reed in his statement of absolute measurements. It is not really so important whether a child measures forty-eight or fifty-two centimeters, or whether certain diameters of the head are this or that. It is more important to study the type of patient with whom we are dealing. Some women can deliver themselves without difficulty of babies weighing nine and a half or ten pounds. Remember, we are dealing here with normal pelves. Others have difficulty in delivering themselves of a six pound child. In each instance careful pelvic measurements have shown we were not dealing with any abnormality. I think it is the latter type of patient that must be carefully observed, and if we have conducted such observations, we ought to be ready to interfere when we think the proper time is at hand.

Another problem relates to the induction of labor in cases of toxemia. We ought to base our attitude in these cases, not on the attempt to bring the child as near term as possible, but at such a period when a viable child can be secured. I think the attempt to carry a toxic woman through the last three or four weeks of pregnancy is a very great mistake because the baby is not in a satisfactory condition during this period and damage results to the maternal organs that can never be corrected.

I was much interested in what Dr. Watson said about the use of quinine in inducing labor, because I only recently read the reports of our colleagues in South America who live in malarial districts and who state that the employment of large doses of quinine for the treatment of malaria in pregnant women has been without result in so far as the induction of labor is concerned. There must be some difference between the women of Canada and South America. Perhaps Dr. Franklin Martin, who has recently visited South America, can explain it.

I was also interested in Dr. Watson's remarks about the use of pituitrin. It seems to me, that he employs very large doses for this purpose. I am sure the New York atmosphere would not permit with safety the continuous employment of doses of half a c.c. as many times as he recommends.

In conclusion, I want to refer again to the valuable work which has been done in the last few years by Dr. Reed and others in bringing to our attention the necessity of watching each individual case of pregnancy to determine as closely as we possibly can whether that particular fetus is going to be able to go through that particular birth canal, and we think the time is at hand not to hesitate to help that woman out of possible future difficulty by inducing labor by methods that have now been pretty thoroughly worked out and demonstrated as safe.

DR. HUGO EHRENFEST, ST. LOUIS, MISSOURI.—I would like to add a few words to what Dr. Kosmak has said in relation to the use of pituitrin. I believe it is safe and necessary to continue the old teaching that pituitrin should not be used in any other stage of labor except the second or third or after the third.

In my experience considerable difficulty arises from the dosage question. Dr. Kosmak says that one-half c.c. is too large a dose. I use smaller doses. Then again the difficulty in my experience is that pituitrin preparations vary. I have for years limited myself to one preparation because I feel I know what I am using. If we use a different preparation we have absolutely no idea what dosage we really use. I find that when a patient receives pituitrin for the purpose of starting labor, there is a decided difference whether the patient after the injection remains lying on her back or whether she gets up and walks around. I have no doubt in my mind that when a patient is kept lying on the back the contractions continue much longer. Why, I do not know. I would like information from Dr. Watson on that point.



Regarding the blood pressure which was mentioned by Dr. Watson, I should like to emphasize that the special effect of various preparations seems entirely dependent upon the amount of histamine it contains. Some preparations raise the blood pressure very little, others very much.

With reference to the effectiveness of starting labor that way, we all probably realize the pronounced difference between primagravida and multipara and between labor starting before normal term and after that. There is no doubt a multipara who has gone over time responds most promptly.

I desire to emphasize one point already made by Dr. Watson, that such a method of starting labor has great advantages over all mechanical methods, if one should be forced to resort to Cesarean section afterward.

I should like to call the attention of Dr. Watson to the new literature on the intravenous use as an oxytocic, of the bi-hyperchlorate of quinine.

DR. J. WHITRIDGE WILLIAMS.—Two things interested me very much in this discussion. The first is Dr. Watson's contribution concerning the effect of pituitrin, and I earnestly hope that the future will bear out his experience, for if it does so he will have added a great boon to workers in obstetrics.

The other thing which interested me very much was what Dr. Reed has said concerning the induction of abortion in post-mature children. In my own work, I have recognized practically only two main indications for the induction of labor. First, in women suffering from the toxemias of pregnancy which do not yield to prophylactic treatment. In such cases we interfere primarily in the interests of the mother and only secondarily for the sake of the child. The other indication is found in patients who have reached term, and in whom the child promises to exceed the normal limits. On the other hand, I have never been a friend of the induction of premature labor in contracted pelvis, and in my whole experience have only employed it on several occasions.

During the past week I have had an experience which pretty well exemplifies my practice. I did a Cesarean section at an appointed time before the onset of labor upon a woman with a normal pelvis, solely on account of the size of the child. The sequel showed that my diagnosis was correct as the child weighed 4300 grams and had a biparietal diameter of 11 cm. In other words, definite disproportion existed. At the same time there was a colored woman in the service with a generally contracted rachitic pelvis with a diagonal conjugate of 9 cm. She had a small child and no disproportion, was left alone and had a spontaneous labor.

At term I think that we should be extremely careful about inducing labor, and should not think of resorting to it unless we have a perfectly justifiable indication. To my mind such an indication does not consist in the mere fact that so many days have elapsed since the last menstrual period, or that the child has attained the average normal size, but we must demand that it has attained a size which threatens to give rise to disproportion and will certainly do so if allowed to become still larger. In other words, I see no reason why labor should be induced in a woman with a normal pelvis unless the child definitely exceeds the usual size, as to do so would simply lead to what I am afraid we are approaching in so many lines, namely, excessive operative interference. I am sorry to say that this tendency has already become established in regard to Cesarean section and, unless the indications for the induction of labor at term are carefully guarded, that operation will likewise be soon abused to a similar extent.

However, I do not wish to be misunderstood in this matter, as I regard with suspicion every woman who has reached the calculated date of confinement without falling into labor. In such cases it is my practice to palpate the patient each week and, as soon as it appears that the child threatens to exceed the normal size, labor should be induced. In general I have found the most satisfactory method of inducing labor, where haste is not essential, is by the use of a large Wales' bougie. I use one the size of the finger and it is so satisfactory that I employ bags practically only in cases of placenta previa, which are not under discussion.

DR. HAROLD C. BAILEY, NEW YORK CITY.—On our Bellevue Hospital service we have been committed to the idea of the induction of labor at term, but I cannot say that it has been a routine. Various factors have prevented this. The service is so busy from admissions that it is difficult to do a procedure like this regularly; but every week we go over the

antepartum cases and those who seem to be oversize or full term have their labors induced. We always start by a method somewhat similar to what Dr. Watson has outlined. We dilate the cervix to two fingers, and then give a dose of castor oil directly, and 10 grains of quinine some two hours afterward.

A great number of these women will fall into labor in the early morning hours. Since the first of the year, in addition to this, we have been adding 3 minim doses of pituitrin, giving four doses one-half hour apart.

The records kept of patients at Bellevue have been of the dispensary class and I can give the records only from my own notebook. It shows there were 35 cases in which the induction of labor was attempted by means of dilatation to two fingers, then the giving of castor oil and 10 grains of quinine. Of these 35 cases, 12 were primiparae, and only 3 or 25 per cent went into labor the first twenty-four hours. Of the remaining 23 multiparae, 56 per cent of them went into labor the first 24 hours. Taking the combined 35 cases, 45 per cent went into labor without any further treatment. If the woman does not go into labor following this procedure we usually allow 48 hours to go by and then a No. 4 Voorhees bag is inserted. We do not use a bag less than No. 4 except in placenta previa. If we talk from the standpoint of the treatment by bags and if we take the records from the Manhattan Hospital service where induction of labor at term is not routine, we find in going over 161 cases of induction, there are 60 cases of vertex presentations induced for rupture of the membranes or dry first stage, or oversize of the fetus. Of these 60 cases which might be termed more or less normal, there was a stillbirth rate of 3 cases, but one case was an anencephalic child. Disregarding the monstrosity we still have stillbirths at 3.3 per cent and the mothers remained normal.

DR. RUDOLPH W. HOLMES, CHICAGO.—One of the mysteries of life will be unfolded when scientific knowledge tells us when pregnancy begins. Until that time comes, we always will be uncertain as to what full time or term means. The uncertainty of the onset of pregnancy carries with it a doubt as to maturity measured by days or weeks. There are large men, women and children—just as there are small ones. Children, for example, of ten or twelve years of age, may be over large or very diminutive for their years, yet at maturity are just ordinary individuals. Unborn babies vary as to size, yet are normal for the period of gestation considered. They may be large or small as the case may be, yet are “normal.” We all know that there is a material variation in size of children born from different mothers. Size, *per se*, is a poor criterion of what we call maturity, or, for that matter, frequently of viability. I have had one woman who gave birth, on the day of reckoning, to a thirteen and a half pound baby. No one would hold that child to be postmature. Some years ago I saw a woman who was about to have an induction because the fetus was over large, yet, at my insistence she went on, and nearly three months later gave birth spontaneously to her baby. In this latter case an erroneous miscalculation of the period of pregnancy was made, and such mistakes may be readily made. We all have seen babies born prematurely, by the accumulated evidence of all data, yet had the appearance and viability of full term babies.

With reference to pituitrin, in my belief it is the most powerful drug known. It has been stated by an official of one of the large pharmaceutical houses that the fluid contained in the cubic centimeter ampule contains, as nearly as they can compute the dosage, one three to four millionth of a grain of the active secretory substance of the pituitary body. Such an active substance demands the most circumspect exhibition. The pituitary substances are used most promiscuously by the profession and in a very haphazard manner. I have long felt that the fact that so few catastrophies have followed this indiscriminate use is dependent upon the fact that there is such a wide difference in the potency of the products of different manufacturers. Dr. Young, of the Public Health Service, investigated the potency of various pituitary fluids and found that some were as low as one-eighth the strength of some others. Over a generation ago, it was appreciated that the indiscriminate use of ergot, given in labor, was followed by most lamentable catastrophies: I believe we are arriving at the same realization of the dangers of pituitary substance. I am convinced that the exhibition of a full ampule of pituitary fluid, yes, even one-half ampule doses, repeated half hourly for six doses as a means of inducing labor will sooner or later spell disaster, especially if employed by physicians who are unable to gauge its dangers.

DR. N. SPROAT HEANEY, CHICAGO.—Since there are so many involved points in the discussion of the indications for the induction of labor, I shall confine my remarks entirely to that technic. The case that Dr. Holmes spoke of where a patient went three and a half months after she was estimated to be at term, as well as the case of a certain Lilliputian baby will illustrate what I mean when I say "involved." In reference to these particular cases, however, I would say that where such cases happen, the "specialist" had better go into eye, ear, nose and throat rather than into obstetrics.

At the Presbyterian Hospital we formerly used bags to induce labor almost to the exclusion of other methods, until we became convinced we were having more trouble with the bags than benefit gained by their use. Latterly we have used quinine and castor oil almost exclusively. At the time of examining the patient to see whether labor should be induced or not, we separate the membranes widely from the cervix, then give castor oil and quinine. We always give small doses at intervals, since we find an occasional patient who has an idiosyncrasy to quinine. Even three grains will produce an annoying disturbance occasionally, in which event we may stop the quinine before we have poisoned our patient too extensively. In the event that the first administration of oil and quinine is not successful, we allow the patient to rest before repeating the dosage. During the last two years following this method I have resorted to the bag only three times in the induction of labor. During this period of two years we have had only one baby born dead. These cases were not only induced cases but cases also that went into labor spontaneously. The death in this case was caused from the separation of the placenta. In a second case of induced labor where the placenta separated we did a hasty forceps, and though the child was born alive, it died soon after from forceps injury.

DR. BENJAMIN P. WATSON, TORONTO, CANADA (closing the discussion on his part).—In regard to the dosage of pituitary extract, I myself was rather afraid of it when we first began to use it, but I must say that I am no longer so. The thing to remember is that the effect passes off very quickly. If there is any effect from one single dose, it passes off inside of twenty minutes or half an hour. As there is practically no cumulative effect of the drug, I do not see that it makes any difference how often you repeat it, provided you allow an interval of twenty minutes or half an hour. You must repeat the dose when the effects of the previous dose pass off. I have never seen any bad effects from the use of the drug given in that way.

There can be no question that there is a great difference in the different preparations of pituitary extract. A reliable preparation should be used.

I have not seen any difference in the action, whether the patient was allowed to walk about or kept in bed. We usually keep them in bed and do not allow them to walk about.

There is a difference, of course, in the results one gets with primiparae and multiparae. The results are less certain in the former. The time of pregnancy at which labor is induced has an influence. If the cervix is not taken up at all the induction is more difficult because labor does not begin until the cervix is sufficiently dilated and there is sufficient detachment of the membranes to produce a distinct bulging so that the ovum may descend.

As regards quinine, the method of administering it in acid solution is an important one. This was demonstrated in our use of quinine at Salonica. We took quinine sulphate in powder 10 grains a day without any discomfort. When taken in acid solution one experienced a buzzing in the ears, showing that the quinine was acting efficiently. I have given my patients quinine in this form for the induction of labor. In the same way intravenously a much more rapid action is obtained, but I have never attempted to give the drug intravenously in these induction cases.

DR. CHARLES B. REEP, CHICAGO (closing the discussion).—There is little to add. It has been quite gratifying to note the kindness with which the bag method of induction has been received, a kindness which arises, no doubt, in large part from a polite self-restraint and is on that account the more appreciated.

I am glad that Dr. Holmes has reported in this connection his case of prematurity in which induction of labor was urged. It is in just such badly studied cases that we realize the necessity of making, as a routine, those extra-uterine measurements of the intra-uterine child which I have emphasized in my paper.



DR. JOSEPH B. DELEE, of Chicago, read a paper entitled **The Prophylactic Forceps Operation.** (For original article see page 34.)

#### DISCUSSION

DR. J. WHITRIDGE WILLIAMS, BALTIMORE.—I am sorry to say that there are only two things in Dr. DeLee's paper with which I entirely agree. The first is to allow the cervix to undergo spontaneous dilatation, and the second is the correctness of the general anatomical considerations which he has adduced. With the rest of it I do not agree. Doubtless Dr. DeLee, or the majority of those present can deliver women in the manner he has described and leave them in better condition than had they been delivered in the usual way by the average practitioner. On the other hand, I believe that if his practice were to become general and widely adopted, women would be worse off eventually than had their labors been conducted by midwives.

Recently I have inaugurated the practice of having all my patients come back to the hospital for reexamination one year after delivery in order to determine how they have stood the strain of labor, and what harm delivery has done them. In many instances, I have been greatly surprised to find that they are in far better shape than one has any right to anticipate, but on the other hand I am occasionally surprised to find how marked a degree of relaxation may follow an easy spontaneous primiparous labor. Furthermore, I am quite convinced that if Dr. DeLee's practice should become general, and the women were examined in a similar manner that they would be found to be worse off than the majority I see.

Passing on to what Dr. DeLee has said concerning the treatment of the third stage of labor, I do not hesitate to state that I think he has been perniciously active. In the great majority of cases it is unnecessary to introduce the hand into the vagina, as in most patients the fundus will be seen to rise up within ten minutes after the extrusion of the child, which indicates that the placenta has become separated from its area of attachment and lies in the distended lower uterine segment, while all that is necessary for its extrusion is the application of slight pressure above by the obstetrician.

If I have understood Dr. DeLee correctly, it seems to me that he interferes 19 times too often out of 20. Of course what I say applies to normal labors, but cases of hemorrhage must be treated in a totally different manner. I therefore believe should his recommendation be generally adopted that it would do an immense amount of harm and far counterbalance the good which it may accomplish in his expert hands.

PRESIDENT DICKINSON.—We have the great honor of having with us a distinguished English obstetrician, Dr. Eden, of London, whom I will ask to discuss this paper.

DR. THOMAS WATTS EDEN, LONDON, ENGLAND.—I doubt very much whether this is a prophylactic procedure that Dr. DeLee has described to us. He says he is going to prevent something. Unless he prevents something we are in fear of, I do not think he has made out a case for his operation. He says he prevents laceration which will result in prolapse. He has made two or three admissions on the subject, however, which I think we should not overlook. In the first place, he says he cannot prevent injury which occurs to the pericervical fascia. We do not know it by that name in England. I take it he meant the pubo-coecygeal fascia. He admits he cannot prevent injury of that which occurs from dilatation of the cervix. It is the injury to that fascia which is the cause of cystocele and his operation is claimed to prevent cystocele. He does the operation to prevent diastasis of the levator ani muscles and fascia which covers them. The time at which he does this is when the head reaches the pelvic floor, and I take it he cannot do the operation when the head presents at the vulva. At the moment it is lying between the levator ani muscles which are already separated, but not to a maximum extent. He also admits by his experience that he cannot entirely control laceration, but more laceration occurs after he has already made the incision. It seems to me, therefore, he is not going to prevent very much by his procedure. He is performing an operation which will have no effect in preventing a troublesome form of prolapse which we know occurs, and he can only partially prevent the form of pro-

lapse which may result from laceration of the cervix. The latter, unless deep and extending into a part of the rectum, is not followed by prolapse at all, and he is not going to prevent anything like a hundred per cent of cases.

It seems to me, these are serious objections to the operation. I am in favor of making normal labor as simple a process as possible. We have to remember that the number of women in hospitals is small; the majority of women are confined in their own homes under the care of general practitioners, and the technic of Dr. DeLee is a hospital "stunt," and not one for the general practitioner. It is not right, moreover, that hospital practice should entirely outrun contact with the general practitioner. His students are coming to the hospital, they see the operation, and it is all very well to tell them not to do it, but they will do it because they have seen it done, and the results will be very different from what they are in his hospital. We ought to make the conduct of normal labor as simple a matter as possible, because it will be from the standpoint of the country at large in the hands of comparatively unskilled men, and the harm which may be done by meddlesome midwifery, although his operation is designed to correct it, may in a few years become widespread. I have no objection to hospitals being kept to the front, but they ought not to get entirely out of touch with general practice. What is the matter, as a preventive, with properly sewing up the ordinary perineal laceration which is so frequently found? If we taught students how to sew up these lacerations properly by vaginal stitching and taught them aseptic methods, in my opinion we would do more to prevent prolapse than by Dr. De Lee's operation.

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—I think the point of Dr. DeLee's paper is to distinguish between what is safe for a specialist to do and what is safe to teach students to do. I am in agreement with a great many of the points Dr. DeLee has brought out, particularly his use of an anodyne for the dilatation of the cervix, and this brings out the point that I have inspected a very large number of cervices after pituitrin has been used when the entire cervix has been effaced, and the diameter has been at least seven centimeters, and have seen these cervices torn with a fresh tear extending up into the fornices.

In regard to the delivery, he does save something. He saves more children by auscultation of the fetal heart when the head is on the pelvic floor than by discission of the pelvic floor. We have saved more children since we have adopted this routine in the last six years.

I do not agree with his lateral discission. I do not believe from the results I have had with it that it compares with the suggestion Dr. Pomeroy brought forward before this Society of median discission, and these are the reasons: Union of a belly of a muscle cannot be obtained as can fascial union. Allowing the head to remain on the pelvic floor for a long time dilates, as the doctor has said, the median fascia. Furthermore, it does something else, it dilates the anterior fascia. I have seen women who have had spontaneous labor come back with cystocele as a result of the prolonged second stage of labor. As Dr. Pomeroy has suggested, we now make a median discission after stretching the sphincter in these cases, and we have as a result several hundred women with perineums and anterior pelvic fascia absolutely intact, such as we never had before. Since we have watched other men and have seen their results, I am convinced that episiotomy is a prophylactic procedure both in the interest of the child and the woman's pelvis, whether you do it to the side, as Dr. DeLee does, or in the median line.

I am not at all in accord with his teaching about the third stage of labor. While with the woman under an anesthetic I agree with him that you can push the placenta out, as a rule, it is far better to my mind, and you have less trouble, as was shown in the work we did some years ago, by letting the placenta alone. We got a minimum amount of hemorrhage by leaving these placentas absolutely to themselves. Dr. Williams reports that the quantity of hemorrhage is in excess of what we have had. We have averaged a little less than 250 c.c. in a hundred cases.

DR. HENRY T. BYFORD, CHICAGO.—I think the whole gist of the subject is that of Dr. DeLee recommending this procedure in all cases. There is no doubt but that this should be done in cases in which the fascia begins to separate and injury is going to occur. The fact

that so many cases get well of themselves where they are left to Nature shows that the procedure should be used in the individual case, not as a routine method.

DR. EDWARD P. DAVIS, PHILADELPHIA.—We should teach third and fourth year students how to deliver normal cases without interference, and tell them to wait twenty minutes or half an hour for the placenta to come away. If a student has an abnormal case of labor to deal with that is complicated, it is as grave a case as an ovarian tumor, and he should summon expert opinion. Then that patient should go to a hospital for forceps application, embryotomy, or other procedure. I cannot see that the procedure advocated by Dr. DeLee is applicable. The fasciæ do not become obstructed necessarily until labor is fully established. When natural labor begins, if anything is done, let it be done thoroughly and surgically under anesthesia.

DR. DELEE (closing the discussion).—I regret very much I did not have five minutes more to complete my paper because a number of points subsequently raised would have been clarified.

First, as regards the danger of this operation and the matter of interference in natural labor. I consider the operation I have described is much less dangerous than the use of pituitrin to induce labor and the use of bags to induce labor at term as has been recommended to you today. I consider these procedures much more radical interferences than the method I described. In the second place, one danger only exists, i. e., doctors who have no business to do the operation are going to do it. That is unfortunate and unavoidable, and I will say no more about this phase of the subject.

Women clamor for relief from the dangers and disabilities of childbirth and we have to afford them relief. They are tired out; they are neurasthenic; they have backache, rectal and bladder trouble, and they say they never have been well since the baby was born, and we have to do something to prevent these bad sequelæ of labor. They even beg for Cesarean section to escape the dangers and pain of childbirth. They will tell you that Mrs. So-and-So who had a Cesarean section done, has no backache, while they have.

Regarding what Dr. Williams said about introducing the hand into the uterus; it is unnecessary to put the hand high into the uterus by this method. The placenta pouts down into the vagina under the influence of pituitrin and all you have to do is to press on the fundus and it falls into the basin. Where it does not come out of the vagina you put your hand into the cervix, and the placenta will slide down like the heel along a shoehorn. I am not afraid to put my hand into the uterus.

Regarding the remarks of Dr. Eden, if he had heard the rest of my paper he would have learned what incision of the pelvic floor and perineum prevents. It absolutely prevents cystocele. There is extreme circular tension of the fascia at the pelvic outlet; an incision in the posterior quadrant of the fascia relieves pressure on the pubouterine ligaments, the subvesical or vaginal fascia (which is so important in the operation for cystocele), and if the operation of prophylactic forceps does nothing else than to prevent cystocele, I would present it to you with supreme confidence.

Dr. Eden stated that the levator and pillars are already separated when I do the operation. That is not so. The right time to perform the operation is when the levator ani just begins to feel the crushing effect of the head.

About sewing up lacerations that occur in natural delivery, I wish to say that I have sewed up thousands of lacerations after delivery and have never been fully satisfied, and I claim no lack of skill; but when I sew up a perineotomy wound I can distinguish fascia and muscles beautifully. When I get a laceration to sew up where the head has been pounding and grinding the muscle like a piece of steak is pounded with a mallet, I cannot get good results.

In what other respect is the procedure prophylactic? Where the baby's head is crowded through a contracted brim you know what has happened to the brain and its vessels. There are minute and larger hemorrhages. The same is true when a head is driven through a tight outlet.

In going over the history of primogeniture we learn that the first born had a high mortality and morbidity and that children of subsequent labors, not the first labors, were people who moved the world. Benjamin Franklin was the seventeenth child.



I say that this procedure saves the mother from exhaustion and hemorrhage. I disagree with those who say that women may lose 500 c.c. of blood with impunity. The less blood a woman loses at labor, the better.

Dr. Byford said something about the number of cases that go through labor spontaneously and have good perineums. I have yet to see an anatomically perfect perineum in a woman that has had a spontaneous delivery of a normally large child at term. I have had in the last two years over 200 private cases, and of this number 85 were forceps applications, and 39 cases of prophylactic forceps. I do not do the operation in every case. Most of the cases of multiparæ with large pelvis do not need prophylactic forceps.

In the remarks made by Dr. Davis he implied that what we teach our students is different from what we practice, and I agree that we should teach this method only to our advanced scholars.

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**DR. J. WHITRIDGE WILLIAMS, of Baltimore, read a paper on *The Value of the Wassermann Reaction in Obstetrics based upon the Study of 4547 Consecutive Observations.***

Dr. Williams said that in 1915 he studied the fetal and infantile deaths in a series of 10,000 consecutive deliveries, and in his presidential address before the American Association for the Prevention of Infant Mortality, stated that syphilis was the most important single cause and constituted the etiologic factor in 26 per cent of the deaths occurring in his service between the end of the seventh month of pregnancy and the two weeks immediately following delivery.

As the result of that study, he concluded that the most immediately fruitful field for prenatal work lay in the earliest possible recognition of the existence of syphilis and its intensive treatment during pregnancy and that this could best be accomplished by making a Wassermann test upon every patient entering the service. Consequently, from April, 1916, to the present time a specimen of blood is withdrawn from every patient at her first visit to the dispensary, and if a positive Wassermann is obtained, she is subjected to intensive treatment in the hospital department of syphilis. Furthermore, in the hope of increasing our knowledge concerning the incidence of the disease, as well as its clinical significance for the mother and child, a Wassermann is likewise made from a sample of fetal blood obtained from the umbilical cord immediately after delivery. Every placenta is weighed and described macroscopically, after which portions of it are hardened, cut, stained and subjected to microscopic examination. Finally, whenever the child is born dead or dies within the first two weeks of the puerperium, every effort is made to secure an autopsy, at which particular attention is paid to the detection of syphilitic lesions, and a positive diagnosis is not made unless spirochetes can be demonstrated in the fetal organs.

The present work is based upon the study along these lines of 4000 women and their children who were delivered in the Johns Hopkins service, out of 4547 admissions, between April, 1916, and December 31, 1919. The patients were almost equally divided between whites and blacks, though the latter slightly predominated—1839 and 2161, respectively.

On this occasion he desired to refer incidentally to the part played by syphilis in the causation of fetal death, then to consider more fully the significance of the maternal and fetal Wassermann, next to take up briefly the value of the microscopic examination of the placenta in the detection of syphilis, and finally to say a few words concerning the status of Colles' law. The subject of syphilis as a cause of fetal death was considered in detail in an article on "The Significance of Syphilis in Prenatal Care and in the Causation of Fetal Death," which appeared in the *Bulletin of the Johns Hopkins Hospital*, May, 1920.

That article was based upon the study of 302 fetal deaths, 99 whites and 203 blacks, which occurred in the 4000 deliveries under consideration. It showed that syphilis was the most important single cause of death, and that it was responsible for 34.4 per cent of the total number. These figures did not include the children discharged alive with hereditary syphilis, or those in whom the disease developed later. Furthermore, it was shown that syphilis was responsible for more than twice as many deaths as the next most important cause, namely, dystocia, as well as for nearly as many deaths as the next three most common

causes combined, namely, dystocia, toxemia, and prematurity. The figures indicated that these three causes were responsible for 37 per cent of the deaths as compared with 34.4 for syphilis. At the same time, he pointed out the great difference in the incidence of the disease in the two races; syphilis being responsible for 12 out of the 99 white, as contrasted with 92 of the 203 black deaths, an incidence of 1 to 8, and 1 to 2, respectively.

After these preliminary remarks, Dr. Williams took up the study of the significance of the Wassermann reaction in pregnant women. In the 4000 women delivered during the period under consideration, 449, or 11.2 per cent, presented a positive reaction during pregnancy. Its incidence was much greater in the black than in the white women, being 16.29 per cent and 2.48 per cent, respectively. In other words a positive Wassermann was noted in every sixth colored woman, as compared with every fortieth white woman.

What this means serologically, it is impossible to state at this time, but practically it means that in this material, about one baby in one hundred (43 out of 4000) will have syphilis even if the maternal Wassermann is negative. Consequently one is not justified in claiming that the most ideal prenatal care can entirely eradicate the disease as a cause of fetal death. Of course, in practice the results will not be quite so bad as here indicated, for the reason that the condition would probably be recognized after the birth of the first syphilitic child, when the mother would be properly treated with a reasonable prospect that future children would be exempt from the disease.

The practical bearing of this aspect of the problem may perhaps be elucidated by a little calculation. For example, if it is assumed that 11 per cent of our women have a positive Wassermann and that, without treatment one-half of their children would be syphilitic, we should expect 55 syphilitic children in every 1000, plus 10 others (1 per cent), which would be born of women with negative Wassermann, or a total of 65 per 1000. Consequently, our figures indicate that even though routine Wassermann tests were made early upon all pregnant women and efficient treatment instituted at once, only five sixths ideal results would be obtained. Of course, this would apply only to the first delivery in the service, as in women with negative Wassermanns the existence of syphilis would be detected after the birth of the first child, when treatment would be immediately instituted afterwards and be followed by excellent results in the future.

Generally speaking, Dr. Williams felt justified in concluding that such a result should not discourage us, for if we were able to reduce the fetal mortality from syphilis by five sixths, its eventual incidence would scarcely exceed 1 per cent, and it would be converted from the most common cause of fetal death into an infrequent one.

Turning to the consideration of the significance of the fetal Wassermann at the time of delivery, the material shows that a positive result was obtained in 36 of the 4000 observations, approximately 1 per cent. This means that only a small fraction of the children born of mothers with a positive Wassermann present such a reaction. It should, however, be remembered that macerated children are not available for the tests, as their blood is already "laked."

In order to arrive at a conclusion as to the value of such investigations, an attempt was made to determine the fate of the 36 children concerned. For this purpose, they were visited at their homes, were subjected to a careful physical examination, and a sample of blood was removed in order that the Wassermann might be repeated. As three years had elapsed since the oldest cases had been discharged, it is not surprising that nine of them could not be located, thus leaving 29 available for consideration. Fourteen of the children died within the first month, mostly in the service, and in 12 of them syphilis was demonstrated. Five of the children developed clinical syphilis later, while 10 others presented no clinical signs of the disease. In these a Wassermann repeated months or years after the original gave positive results in 5 children, while it was negative in the other five.

In other words, out of the 29 children which presented a positive Wassermann at birth, 17 developed definite evidence of syphilis; 5 showed no clinical signs, but continued to have a positive Wassermann, while 7 showed no signs in association with a negative Wassermann. Accepting the positive Wassermann as conclusive evidence of the existence of syphilis in the child, it appears that the primary reaction corresponded with the clinical and anatomical findings in 76 per cent of the cases.

During the course of years, Dr. Williams became convinced from the routine microscopic study of the placenta that the syphilitic lesions occurring in it are extremely characteristic, and afford more conclusive evidence of the existence of syphilis than the demonstration of a positive maternal Wassermann, and in general tally fairly closely with the autopsy findings in the child. For this reason he was curious to ascertain in how far the results of the present study would sustain such conclusions.

From these calculations, it appears permissible to assume that the present investigation indicates that the microscopic examination of the placenta tallies with the clinical and anatomic findings in the child in from 80 to 90 per cent of the cases, which is in marked contrast to the 40 per cent obtained from a positive maternal Wassermann. Consequently, it was pleasing to find that this study confirms previous impressions, and indicates that the demonstration of the so-called Frankel's disease in the placenta offers twice as great a probability of giving correct information concerning the condition of the child as a positive Wassermann on the part of the mother and, in the absence of a carefully conducted autopsy, constitutes the most reliable means of diagnosis at our disposal.

#### DISCUSSION

DR. GEORGE GELLHORN, ST. LOUIS, MISSOURI.—The investigations of Dr. Williams will serve to settle definitely several mooted questions connected with the problem of syphilis in pregnancy. My own statistics obtained from a much smaller material reflect in all essentials the imposing figures of Dr. Williams. I will, therefore, not take the time to submit them in detail at this moment. I merely wish to inquire in regard to two points made by Dr. Williams. The first concerns the occasional birth of a syphilitic child by an apparently healthy (Wassermann negative) mother. As you have just heard, Dr. Williams inclines to the possibility of a gradual immunization of the mother by the continuous casting off of antibodies or chorionic villi into the maternal circulation. But I still prefer to consider Colles' law as incompatible with our conceptions of the pathology of syphilis. I prefer to explain it by such eccentricities of the Wassermann reaction with which Maud Menten made us acquainted about two years ago. As you remember Menten found in a considerable percentage of her cases that a strongly positive Wassermann would turn into a negative one immediately upon delivery, and this happened irrespective of whether or not the patient had received treatment.

The second point is of even greater practical importance. The excellent results of Dr. Williams with energetic treatment during pregnancy should forever quiet the fears of those who object to such treatment because of danger to the child. It may be that some children are born dead in spite of the treatment, but such instances do not mean a real loss to society. On the contrary, they relieve the parents and the community of a serious burden. But there is a much wider outlook to the whole question. We know that our homes for the feeble-minded, our asylums for the blind and deaf, our houses of correction, and our jails are peopled with congenital syphilities. Is it possible to reclaim at least a number of these unfortunate ones for society? A Swedish physician, Dr. Welander, a man of deep humanity and wide vision, was to my knowledge the first to attack this problem. He founded, in 1900, a home for hereditary syphilities, and found that if energetic treatment was instituted early enough and continued for four or five years, a very large proportion of his little patients measured up to healthy children, physically, intellectually and morally. Welander's example was emulated in Germany both by private and municipal initiative and here, too, favorable results were observed.

At the Children's Hospital in St. Louis similar efforts have been made for the last four or five years and Dr. Jeans, who conducts the work, expressed himself very optimistically to me. The one thing all these pediatricians deplore, is the fact that they do not get the children early enough, but if Dr. Williams' plan be systematically carried out by all obstetricians, all babies would get their first treatment *in utero* and before the disease has had time to make headway. They would thus get a proper start in life and the obstetrician by anticipating the work of the pediatrician, would benefit not only the individual but the entire race. Let us, then, support by all means the appeal of Dr. Williams for the efficient treatment of syphilis during pregnancy.



DR. REUBEN PETERSON, ANN ARBOR, MICHIGAN.—When I received notice that Dr. Williams was to read a paper on this subject, I tried to get some statistics from our clinic, inasmuch as we have been interested for a number of years in this question. Unfortunately I was unable to obtain all the data I desired. However, the data I have collected I thought might be of interest, as they include the Wassermanns from a large number of patients admitted to the hospital, besides the patients in the obstetric and gynecologic clinic.

It would seem at first that it might be difficult to obtain a Wassermann from every patient admitted to a large hospital. We have found no difficulty whatever at the University Hospital. When patients apply for admission a Wassermann is taken in every instance and this procedure shows some rather interesting findings. The examinations include patients from all departments. There are a number of patients distinctly syphilitic applying to the department of dermatology, but still there are large numbers in the general hospital who show positive Wassermanns. Out of 5965 patients admitted in six months, there were positive Wassermanns in 19.6 per cent. That is a surprisingly large percentage according to my reading.

Turning to the Department of Obstetrics and Gynecology, there were 1348, a comparatively small number as compared with Dr. Williams clinic. It is interesting, however, to check up on Dr. Williams' statistics, as only occasionally do we have a colored patient. Our statistics show that there were 643 Wassermanns taken of the mothers, with 44 positives, or 6.4 per cent.

Turning to the children (in the obstetric department of the clinic) we find that of 671 children examined, practically the same number were positive, that is, 6.7 per cent. If I am correct, this is a much larger percentage than Dr. Williams obtained. But in the women applying to the gynecologic clinic, we find that in 1247 examinations there were 114 positive Wassermanns. In other words, the women who applied for treatment, for diagnosis, and so on, in this clinic showed a 2 per cent higher rate than in the obstetric clinic, which was surprising to us, for we thought the ratio in the obstetric clinic would be larger than that in the gynecologic clinic because a large proportion of the children born of these women are illegitimate.

I also have had a record made of every placenta examined microscopically, and I am quite sure without investigating these cases the results will bear out what Dr. Williams has stated, namely, that the Wassermann is only a check. It is a stimulus to investigation, but the real knowledge of whether a woman is syphilitic will come better from an examination of the placenta than from the Wassermann because there are so many factors in the Wassermann examination that contribute to make it doubtful.

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—In our prenatal clinic, at the Long Island College Hospital, largely through the work of my associate Dr. Beck, we have been making Wassermanns in every patient who applies. It is interesting to note that a history of syphilis has had little value in our investigations save in the cases where there has been a history of repeated miscarriage and, unless a routine Wassermann is made on every patient who applies to the prenatal clinic, syphilitic cases may escape notice. We tried for a number of years to make Wassermanns on suspected cases and have been surprised to see how few reactions we obtained, but since we have been making a routine Wassermann of every prenatal case, our statistics are similar to Dr. Peterson's. We are dealing with white women; we have very few colored women, and we have about 6 per cent of positive Wassermanns. Where a positive Wassermann results, the test is repeated as we have found there is a discrepancy in the Wassermanns unless they are repeated, always twice, sometimes oftener. We have only checked up the positive Wassermanns that have come back after two positive examinations.

Another point of considerable interest is this: Immediately on the discovery of a positive Wassermann in a pregnant woman, no matter at what stage of pregnancy she is, we should give her salvarsan, even if it is a week before labor. It has been brought to our attention that women who have had positive Wassermanns and who have had an injection of salvarsan prior to their delivery give birth to a child which is more likely to survive, for the baby has received prenatal treatment and is not so likely to succumb to the pneumonias and other conditions prevalent in the first week or so after delivery.

One other interesting fact is that during the last year wherever women had a positive Wassermann and received salvarsan, we have had only one stillborn child due to syphilis.

DR. HAROLD C. BAILEY, NEW YORK CITY.—This subject is so important from the standpoint of the reduction of stillbirths that, it seems to me, we should have a little more data regarding the problem of the child and what will be the future of these children we have saved, and how far shall our advice go with reference to further treatment. We have had three instances in the past month in the Bellevue Hospital service, in two of which the diagnosis of spirochete was made by the microscope with dark field, with apparently normal children, and one woman with a positive Wassermann with a normal child. The question is, how far shall our treatment extend with negative Wassermans in these babies? There will come a time when these Wassermans will become positive in the infants and they should be treated as syphilitic infants. Shall we inject salvarsan into the longitudinal sinus of the baby, or adopt the mercury inunction method, which is seldom followed out?

DR. WILLIAMS (closing the discussion).—It is very interesting to hear that Dr. Peterson observed a much higher incidence of positive Wassermann reactions in his white women in Michigan than we have in Baltimore. I cannot account for it, except that in a general way it confirms the experience of his colleague in pathology (Professor Warthin) who found if I remember correctly that 40 per cent of all the autopsies which he performed in Michigan showed signs of syphilis. If he is correct, it would seem that Dr. Peterson's figures are surprisingly small.

In regard to what Dr. Polak has said, I can only endorse his statement that in a large number of cases we were unable to elicit a definite history of infection, as in our entire series we could obtain a history of a primary sore in only a small number of cases, while a history of secondary or tertiary lesions was lacking in 80 per cent of the patients. In other words, it is my experience that if we were to rely upon the history alone, four-fifths of the patients would escape treatment.

Regarding repeated Wassermans, I can only say that they are repeatedly made upon our patients, for, whenever they present a positive Wassermann, they are not treated by us, but by the department of syphilis of the hospital. In that service a Wassermann is taken with each dose of salvarsan, so that in the patients who are efficiently treated, we have a large number of controls. After the patient has had six salvarsan injections she is given a course of mercurial treatment, and if at its conclusion the Wassermann is still positive, another course of salvarsan is given.

In general, I think that the most important fact derived from our investigations is the very wonderful results which we obtain from efficient prenatal care, and my paper shows that one of the important duties of the prenatal clinic is to detect the existence of syphilis at the very earliest possible period of pregnancy and to treat it energetically. In my experience the difficulty exists not in making the diagnosis, but in persuading the women to return at regular intervals for treatment. As we have developed this work, it has been necessary to increase greatly the number of prenatal workers, so as to educate the women to return regularly. After delivery the cases are followed up to ascertain what happens to the mother and the child, and the amount of work which is required to get ideal results in this respect is appalling.

DR. JOHN A. MCGLINN, of Philadelphia, read a paper entitled **Extraperitoneal Cesarean Section**. (For original article see page 45.)

## DISCUSSION

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—After the arraignment Dr. McGlinn has made of extraperitoneal procedures, I have some hesitancy in opening this discussion.

I have had no experience with the true extraperitoneal operation. The last one performed in our clinic was done by the late Dr. Skene and the last one I saw performed was about a year ago at the New York Lying-In Hospital. When I saw Dr. Skene do the operation it impressed me as a bloody procedure, done out of sight, and had none of the advantages that a surgical procedure should have.

We have done a very large number of classical Cesarean sections, and we feel that there are some objections to it. We have reopened 17 of these classical cases. We studied the scars in these 17 cases; we found adhesions of the intestines to the scar in 5; we found weakened scars in 12 covered by omental attachments. For this reason and on account of the morbidity we were getting, we analyzed our cases and at the suggestion of Dr. Beck we have done a modification of the Krönig operation. We believe that infection does not come from the spill; we believe any surgeon can protect the abdomen from the spill in the classical operation.

We furthermore believe that infection comes from the endometrium and in our autopsy observations after the classical operations, where the patients have died of peritonitis, we found that along the suture line we had the same picture that presents itself when we have supuration of the abdominal wound around silkworm gut suture. The infection came from the endometrium, which is admitted to be the most frequent site of infection of the uterus. It is the carrying in of the flora from the vagina into the uterus that gives rise to the endometritis and the suture carries it through to the peritoneum. After doing a number of Krönig operations, I tried the Veit-Fromme-Hirst operation, but found we did not protect the peritoneum so we are now doing Beck's modification of the Krönig. We have the scar low down under the bladder reflection and, as a result these patients do not have adhesions and convalescence is smoother.

Another point of great interest is that we have done this operation in the frankly infected cases. We have no instance of dystocia in cases where we have resorted to this procedure. In an experience of 260 classical operations we have only had to do 2 Porro operations. I do not believe the universal principle that has been taught that in each case of infection a Porro operation is the only thing to do, is confirmed by our experience. The principal point to my mind of the transperitoneal operation is that those patients who are suspected of being infected can have their uteri saved.

In regard to rupture, all of us have done anterior vaginal hysterotomy; all of us have effected subsequent deliveries through the scar. What is the difference between a low operation and vaginal procedure? Rupture through the scar in this location is not a serious matter as the rupture is under the bladder reflection. We have seen them dilate; some of them rupture, but we have never seen a fatality in these cases and we have done a large number.

DR. JOSEPH B. DELEE, CHICAGO.—I am much interested in these newer forms of Cesarean section. I have given up true extraperitoneal section, that is, where the peritoneum is preserved and no opening made into the peritoneal cavity. I have noticed, too, in reading the later European literature that over there the extraperitoneal Cesarean operation is being displaced by the low cervical Cesarean, and the high or corporeal, or old classic, Saenger, or as it should be called the Saenger-corporeal or fundal-Cesarean section, is discarded for the low cervical. I claim the low cervical Cesarean section has distinct advantages over the classical and I perform it in nearly every case except for certain conditions. These conditions are getting fewer.

I would like to ask Dr. McGlinn if in the course of his study of the literature he has found a single case of rupture of the uterus after cervical Cesarean section? Considering the thousands of operations that have been done already, we ought to have some cases of



rupture of the uterus. I have come across three cases of rupture of the uterus. In two reported by Küstner, the rupture was in a portion of the incision which had extended into the fundus. The other of the three was in a woman who had had a Cesarean section, went into labor and burst the uterus, not at the site of the incision, but to one side. I would be glad to get a report of some authentic cases of rupture of the uterus.

I have done 50 cervical Cesarean sections where the cut lies in the same location, and I have not yet had a case return to me or a report of rupture of the cervical scar.

Dr. McGlinn made the statement that the operation cannot be done in placenta previa. I used to think so too. I discovered a placenta previa in a case the other day in which I resorted to cervical section. There was less hemorrhage in this case than in some cases where there is no placenta previa.

Lichtenstein in 1919 reported on low cervical Cesarean section, and in 4 of his cases the placenta was attached to the anterior wall. All recovered. We have had 50 Cesarean sections of the low cervical variety and no deaths except in one case, and I feel I should have done a craniotomy in that instance. The woman was in labor four days: she had a blood pressure of 208 mm., with albumin and casts in the urine. Her urine was smoky. She had intertrigo all over the abdomen. The head could not engage. She weighed 278 pounds. As I have said, I should have done a craniotomy in this case. This woman died of peritonitis. I expected too much from the operation. All the other cases made fine recoveries. Two had suppuration.

Dr. McGlinn said that this operation will never generally be adopted. This is probably true of the extraperitoneal method. Our German confreres are performing this operation in cases that are frankly infected. In 500 cases reported by 4 operators, the mortality was  $2\frac{1}{2}$  per cent. The absence of adhesions in these cases is remarkable. It has been stated that the operation cannot be done on the same patient twice. That is not true. I have done it on two patients twice. Lichtenstein has done it three times on a number of patients. In my two cases the peritoneum hardly showed the scar.

I wish to suggest a little improvement in the technic. If you make a careful dissection of the peritoneum downward off the anterior wall of the uterus where it reflects on the bladder, if before you cut into the uterus you move the tissues a little, you will see a distinct layer of fascia. You can slit the fascia down individually or you can make a cut into the uterus, cutting the fascia at the same time as you do the muscle of the cervix. When you come to sew it up you do it in the same anatomic manner. In the last three or four cases I made a separate line of sutures in the fascia, so that there were two rows of sutures in the cervix, one row in the fascia, and a flap of peritoneum, which is a great protection against leakage from the uterus, and gives the firmest possible uterine scar.

DR. EDWARD P. DAVIS, PHILADELPHIA.—One of the worst cases I have ever seen was a Cesarean section done by myself on a woman upon whom previously this kind of extraperitoneal operation had been done by a skillful surgeon. The adhesions were the most extensive I have ever seen in any abdomen. I would therefore question the statement made that adhesions cannot form after the operation. Extraperitoneal Cesarean section is evidently a practical impossibility, but it is a curious thing that a few months ago the old Thomas elyototomy was actually in process of revival and was being done in this country, so that there is a great tendency to seek some method of extraperitoneal operation. It should only be done in very difficult cases, but even then it cannot be considered dependable.

Much has been said concerning infection. How can you deliver a woman who has been long in labor and dangerously and possibly fatally infected? If you attempt to make bacterial culture, must you judge by the appearance of the decidua or the odor? I can only say that in a considerable number of cases of suspected women in doing the classic section the uterus has been drained by packing carried through the vagina. Ergot and strychnine have been given hypodermically to induce firm uterine contractions. These women have had sapremia, have lived, and maintained the function of reproduction. While that is a gamble, are not many surgical operations in some sense a gamble? In the frankly infected cases I think the majority of us are agreed that safety lies in one direction, if infection can be admitted to be present, namely, we should resort to section with the amputation of the uterus and leaving the stump outside of the peritoneal cavity.

I should be glad to see any practical demonstration of the value of the transperitoneal section, but I believe extraperitoneal section has proved a practical impossibility.

DR. RUDOLPH W. HOLMES, CHICAGO.—My whole experience has been negative in the employment of the newer methods of Cesarean section. I may be erroneously satisfied with my own work, but I feel that the dangers do not rise or fall by any particular method or technic of operation, but are directly due to the conditions present before, during, and after operation. I have always everted the uterus, packing off the bowel, and closing the abdominal wound behind the uterus by means of a bullet forceps, have always torn open the uterus after a preliminary outline by means of a scalpel. I have now a considerable series without any mortality. Essentially, the plan I follow was instituted about fifteen years ago; in the previous years I had three fatalities in the first ten sections. I have never performed a section on the pelvic indication before labor, except it be a repeater or there was an absolute indication, unless there had been a thorough test of labor. My experience convinces me that the mere length, prolongation, of labor places no jeopardy upon the mother or baby, provided her vital forces have not been sapped, as shown by a rapid pulse, elevation of temperature, or the facies of exhaustion, nor upon the child provided the heart tones have not radically altered in character. A truly tired woman is not a safe risk for any operation. I have done Cesareans when the membranes have been ruptured many hours, even in one in which they ruptured nearly three days before without any unhappy reaction during the post-operative period. In fact, I am convinced that a true test of labor is not given the woman unless the membranes have ruptured. It should be an obstetric aphorism that an obstetrician should determine the possibility of the necessity for a Cesarean section as a mental reservation the last days of pregnancy. If this is done, she being held as a specially preferred risk, if no vaginal examinations are made, and if control of labor is obtained by rectal touch and abdominal palpation (and the stethoscope), matters may continue into the second stage, after the membranes have ruptured, without jeopardy to the mother or child. Further, it is surprising how frequently it will follow that such women will have spontaneous labors, or at most a forceps operation of expediency. Labor in women with minor pelvic contraction, with some evident slight pelvo-fetal disproportion, so conducted will only exhibit a small minority who require Cesarean.

The whole sum and substance of the problem is not to stir up the bacterial content of the vagina by vaginal examinations. If infection be suspected, the peritoneum can better dispose of the potential infection than the cellular tissue. Opening up cellular spaces by the newer methods, I believe, endangers the woman more than it prevents trouble, and needlessly complicates the technic. The next two or three years will prove whether these newer, or better rejuvenation of old methods, are not signs of our progress in the fads and fancies of obstetric practice. All the available statistics prove that Cesarean sections are followed by vulnerable scars in the proportion of 16 per cent: the menace of their rupture is a serious problem for him who attempts to conduct a later labor by spontaneous effort on the part of the mother.

The second serious problem is the inevitable liability or probability of adhesions which may cause subsequent distress. Fortunately, in all my sections, so far as I know, I had no such complications, though in the repeated sections, adhesions were found in all with one exception.

DR. McGLINN (closing the discussion).—I am rather free to confess that had I looked up the literature on extraperitoneal Cesarean section before writing my paper, I would not have written it. However, after listening to private conversations and discussions in reference to extraperitoneal Cesarean section, and such absurd claims having been made for this operation, I was led to write the paper.

I have great sympathy for Dr. DeLee because he did not have time to finish the reading of his paper and consequently the points which he intended to bring out he was unable to do, on account of lack of time. I have lost my sympathy for him now because while I hurried through my paper, I am afraid he did not listen attentively to what I was reading. I tried to make a specific differentiation in my paper between extraperitoneal Cesarean section and the transperitoneal Cesarean section, and I still say that in civil surgery of acci-

dents extraperitoneal Cesarean section, with its difficulties, will never be accepted. Transperitoneal Cesarean section, or the modification as proposed by Dr. Beck, I do believe will meet with general acceptance because incision through the body of the uterus certainly has disadvantages that incision through the lower uterine segment does not have.

I am not aware of any cases of rupture of the uterus below the uterine scar. There have been a number of references made to such a thing, but the literature has not been available to us at the present time or before the writing of my paper.

Dr. DeLee cited the rarity of rupture after vaginal Cesarean section. In the vaginal Cesarean sections which I have seen performed, if you incise the uterus in exactly the same place where you incise after transperitoneal Cesarean section, then I have never seen a properly performed vaginal Cesarean section, or a proper transperitoneal Cesarean section, because in the vaginal Cesarean section you go through the cervix, deflect the bladder up but do not open up the peritoneal cavity, whereas in the transperitoneal Cesarean section you make the incision close to the scar which has been referred to in the literature as quite likely to occur. Undoubtedly there are some cases of rupture of the uterus although I have not been able to find them.

So far as placenta previa is concerned, the operation has been repeated several times in cases of placenta previa.

In reference to the impossibility of performing the operation, I did not say it should not be performed at all, but it should be done under positive indications. In the majority of cases it cannot be performed and that holds true with reference to extraperitoneal Cesarean section, and not to transperitoneal Cesarean section, at all.

I believe so far as the value of the transperitoneal section in the frankly infected cases is concerned, the only protection we have is in the proper peritonealization of the wound. You can do the Beck operation and avoid the difficulties of adhesions and intestinal complications. It fulfills the place of the transperitoneal Cesarean section because any surgeon can wall off the peritoneal cavity as effectively as with transperitoneal Cesarean section. The operation meets every indication the same as the transperitoneal Cesarean section, it is easier to perform, and one that is absolutely shorn of difficulties. The Beck operation has a place in obstetrics at the present time. It is a great advance over the old Saenger operation with the incision made in the body of the uterus.

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DR. HUGO EHRENFEST, of St. Louis, Mo., presented a paper entitled **Recent Progress in Obstetrics and Gynecology.**

This contribution will be made the basis of collective reviews, the first of which appears in this number, page 103.

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DR. THOMAS J. WATKINS, of Chicago, Ill., read a paper entitled **The Treatment of Suppurating Wounds Following Abdominal Section.**

After commenting on the frequency of infected wounds when it is necessary to operate in acute abdominal conditions, Dr. Watkins called attention to the danger of contamination in cases of cancer of the cervix, especially when advanced and also in hysterectomies when a fibroid polypus protrudes into the vagina. The statistics on operation for cancer of the cervix emphasizes the great importance of thorough cleansing of the vaginal canal and cauterization of the cervix before making the abdominal section. Where a submucous infected polypus is present, it is important to remove the same at least two weeks before doing a hysterectomy. Where suppuration is anticipated, it has been customary to establish vaginal drainage with the hope of protecting the abdominal contents from infection, but Dr. Watkins stated that his experience with this procedure had been disappointing.

He believes that the general principles of treatment of infected abdominal wounds is the same as other wounds in other parts of the body and stated his conviction that the general custom is to overemphasize their treatment and consequently to delay repair, to unnecessarily disturb the patient and to impair the strength of the abdominal wall. In the treatment of



these wounds it is well to bear in mind that the infection does not long remain localized and that cases which do not suppurate are often quite as acute and prolonged as cases which develop suppuration. The presence of pus is, therefore, not of paramount importance. In many instances the treatment of the systemic infection is more important than the direct treatment of the wound and the possibility of spontaneous autovaccination and destruction of the bacteria by their own toxins is worthy of consideration. The treatment recommended by Dr. Watkins is as follows: No sutures are removed until the wound is healed unless this is made necessary by extensive cutting of the sutures into the tissues. No drainage is inserted and no probing permitted. Moist dressings of boric acid solution are kept continuously over the wound as long as it remains reddened or indurated, care being taken that maceration does not result. A large amount of drainage can effectively take place through a small opening with the use of these dressings. Antiseptics are not indicated except in wounds which contain considerable necrotic tissue, when the chlorinated solutions are of value. No exception is made in cases of infected wounds complicated by intestinal fistulæ. Drains are not employed at any time. An important feature of this treatment is that no pain is inflicted and the patient is disturbed very little.

Dr. Watkins stated that he had been using this method for about fifteen years and in his experience the results have been better than where more energetic treatment was employed. The abdominal wall has invariably been as strong as in those cases where no suppuration took place. After reporting two cases in detail Dr. Watkins presented the following summary of his procedure: 1. No sutures are removed on account of suppuration. 2. No drains inserted. 3. No probing permitted. 4. Wet boric dressings are kept continuously applied until induration and excessive redness of the wound disappear. 5. Experience shows that this treatment secures efficient drainage. 6. No appreciable cavity is present at the site of suppuration when the wound is draining; intraabdominal and atmospheric pressure keep the suppurating surfaces in relative apposition. 7. When drainage ceases no open wound exists. 8. Experience extending over fifteen years has demonstrated that with the above treatment the infected wounds have healed in less time, the patients have been much less disturbed, and the abdominal wound has been left much stronger than where energetic treatment was employed.

#### DISCUSSION.

DR. THOMAS WATTS EDEN, OF LONDON, ENGLAND.—I do not understand the principle on which his treatment is based but I infer that Dr. Watkins attaches a great deal of importance to the question of general systemic infection in the case of infected wounds and that therefore this treatment need not be very active. While that may be true, one's experience clinically is that when the local condition is relieved the general condition is at once relieved; that is to say, if one can relieve tension in a suppurating wound the general condition improves at once. He goes rather on the other plan and tries to relieve systemic infection before he relieves tension in his wounds. I would like to know the scientific basis for that assumption.

A general surgical principle concerning which we are all agreed and act upon is that free drainage is necessary for suppurating wounds and, although what he said about the use of antiseptics in wounds may have some justification, I think the experience of war surgery is that such wounds do not do well unless they are laid freely open, so that they can be freely drained and irrigated. We ought to apply simple surgical principles to infected abdominal wounds and it is a departure from principle to leave wounds locked up and not allow free drainage. The treatment we adopt in some cases depends a good deal upon the organism which is present. An ordinary staphylococccic infection will clear up under very simple treatment. Streptococccic infections are more serious. If there is a bacillus coli infection of the wound the proposition is even more serious. It is my practice to have a bacteriologic examination made at once of any pus that appears, and a good deal depends upon what we find. In streptococci and bacillus coli infections it is necessary to open up the wound widely. If you do that and irrigate freely, the wound will clear up, and then you can resuture it. I consider this the best treatment to adopt.

DR. JOSEPH BRETTAUER, NEW YORK CITY.—I agree with Dr. Eden that we should always treat these cases according to the principles of free drainage.

What I was especially interested in and had hoped to hear explained was Dr. Watkins' statement regarding immunization.

DR. JOHN A. MCGLINN, PHILADELPHIA.—Dr. Watkins' analogy between infected abdominal wounds and acute infections of the chest, which the general surgeon has learned to let alone, is not well drawn, because if there was ever a lot of nonsense written about delayed operation it was in reference to delayed operation in cases of empyema. The advantage of delayed operation has been shown and published reports proved that some surgeons were operating at certain camps before the patients had empyema at all; in fact they were operating in cases of pneumonia, doing a simple thoracotomy or rib resection and subsequently the patients died.

Another fact to be noted is that the tremendous mortality following operation, was at the height of the influenza epidemic. When the infection began to subside and patient did not die from the primary infection, the surgeons could operate on these cases and a certain percentage would get well. As the infection became less and less, the majority of patients got well after operation, so that the analogy between the earlier drainage of the chest and delayed operations on the chest does not hold in these particular cases. Dr. Watkins allows Nature to do for him by drainage, what we have attempted to do early in the treatment of wounds, namely, to establish free drainage. In the past the use of antiseptics to sterilize a wound was not of great value, but certainly with the advent of the newer class of antiseptics that does not hold true.

As Dr. Eden says, free drainage and prompt sterilization will enable us to clean up the wounds, suture them promptly and get union by primary intention. That has been my experience in these abdominal infections, opening the wounds, establishing free drainage, and sterilizing the wounds with chlorolyptol, which is a chlorinated eucalyptus oil, or with Dakin's oil, or if there is necrotic tissue, with the hypochlorite solution, and either binding the wound up after a bacterial count is made, or simply strapping the wound carefully with adhesive plaster. In this way we are able to get as good results as Dr. Watkins showed and in a shorter space of time. I have had wounds heal absolutely in five days after opening them up and after sterilization and strapping them perfectly with adhesive plaster.

DR. CHARLES G. CHILD, JR., NEW YORK CITY.—I shall confine my remarks to two points, prophylaxis, and wound closure. It has been my experience that the material used in the wound closure has a great deal to do with infection. I do not believe absorbable suture material has any place in the closure of abdominal incisions. It is notoriously uncertain in its tensile strength and predisposes both primarily and secondarily to post-operative hernia. In the second place, absorbable material used as a suture, if it has any advantage at all it is its absorbability, which is notoriously uncertain, sometimes taking from thirty to forty days. An important point in wound closure is the fact that before such material can fulfil the vaunted virtue of absorbability, it must be converted into a soluble gelatin.

Gelatin is an excellent culture medium upon which bacteria readily grow, especially when backed up by normal tissue secretions. The tissues when in a normal or approximately normal state, will readily take care of a small amount of infection if the wound has been closed, with not infectable, and this means not absorbable, suture material, and is free from devitalized tissue. It is a different story when the wound contains traumatized tissue, in foci produced by strangulating sutures. Such a wound is an easy prey to infection. The wound should be closed with nonabsorbable material and it should be noninfective and permit of removal subsequently.

The method I prefer is continuous mattress sutures of silkworm gut or one of its substitutes, both for the peritoneum, fascia, and skin, with the ends brought out through the angles of the incision. These sutures are removed from the tenth to the fourteenth day. When I gave up the use of absorbable suture material my percentage of primary wound union immediately jumped from less than 80 to between 96 and 98 per cent, where it has remained since that time. When the wound is once infected, the relief of suture tension and free drainage are the important points.

DR. BROOKE M. ANSPACH, PHILADELPHIA.—I appreciate Dr. Watkins' point in the conservative treatment of infected wounds. There is also much to be said in favor of free drainage, but in the early stage of an infection, unless drainage is very carefully made, much harm may be done. I have more than once thought that a comparatively simple infection was made a serious one by too vigorous treatment. In the early stage it seems to me the use of heat in the form of an old-fashioned poultice, will localize the infection. After that, opening up the superficial layers and letting out pus will promote rapid recovery and healing.

There is one thing that has not been mentioned that I have used a couple of times with success, in wounds which, in spite of drainage and systemic treatment, will not heal. I have seen good results from the use of vaccines in these cases.

DR. J. WESLEY BOVÉE, WASHINGTON, D. C.—I think the prophylactic treatment of infection is important. One case Dr. Watkins presented was of cancer of the cervix. It seems to me, we can easily provide against anything but the rarest infections in this manner by not removing the diseased tissue through the abdominal opening, but by separating it from above, pushing it down through the vulva, and removing it in that way after the abdominal wound has been closed. This procedure I have followed since March, 1898, following a paper of Dr. Werder on the treatment of cancer of the uterus which appeared in the *American Journal of Obstetrics and Diseases of Women*, February, 1898. There is no danger of infection of the abdominal wound if this procedure is employed.

I take exception to the remarks of those who insist that absorbable suture material, such as iodine catgut, properly prepared, for closing abdominal wounds, is not the proper thing. I probably do not use in one-tenth of one per cent of my abdominal cases any nonabsorbable suture material in which I have had infection. In those cases in which I expected infection I have followed the plan of closing the peritoneum with a purse string suture and deluging the wound with 2 per cent permanganate solution, suturing it up in layers, closing it with buried sutures, but with no suture through the skin at all. In those in which I expected infection I have secured union, and in those in which I obtained a slight infection in recent years, I considered that they were perfectly clean.

Some drainage is an advisable thing. We should be thankful for the opening which has occurred if suppuration occurs. By changing the position of the patient, drainage is favored.

DR. EDWARD REYNOLDS, BOSTON.—It seems to me that some of the difference of opinion is from lack of discrimination. These are not war wounds. Most of our postoperative suppurations are of very mild degree. If such wounds present a purulent secretion the great majority of them will eventually get well if let alone.

Many of these suppurations originate from a bit of necrotic tissue somewhere in the wound, and I have for many years employed a preparation known as "enzymol," which is a digestive ferment. Whenever I get a necrotic wound, I put pressure on it, empty it of its own fluids, and pour in a little of the "enzymol" to fill the wound up, making approximately a 50 per cent solution. It is amazing how rapidly the necrosis will disappear and leave clean granulations. Many of them close rapidly.

DR. HENRY T. BYFORD, CHICAGO.—I have used the "enzymol" treatment exactly as Dr. Reynolds has suggested, in a 33 to 50 per cent solution. It goes in like a ferret, through the smallest openings, and destroys every bit of the albuminous material without producing any irritation. The pus should be pressed out and the wound be kept moist with the "enzymol" solution.

DR. REUBEN PETERSON, ANN ARBOR, MICHIGAN.—The treatment recommended by Dr. Watkins is rather startling at first, because it does not agree with what we have been doing with our suppurating wounds. If I understood Dr. Watkins correctly, he wants to stop the opening up of these suppurating wounds, that is, by putting on wet dressings a great many of these wounds will heal. On the other hand, we want to bear in mind that there are certain infections where this is a dangerous practice, especially when there is a large amount of suppurating material deep down. I feel safer under these conditions



to go back to our former custom of opening freely so as to get the virulent collections away from the peritoneum as quickly as possible. However, this paper is timely because it will stop opening up widely every wound that suppurates and doing a great deal of damage which can be avoided by the procedure he outlines.

DR. RICHARD R. SMITH, GRAND RAPIDS, MICHIGAN.—A good many years ago we adopted the plan as outlined by Dr. Watkins. We did this gradually, from the free opening of the wounds to doing very little or nothing. We have found it very satisfactory; we have saved patients a good deal of time in the hospital; we have saved patients the possibility of hernia, and altogether it has been a satisfactory procedure. We do not do exactly as Dr. Watkins does; we do not put on a wet dressing; we examine the wound, and when suppuration seems close to the skin we open up and encourage drainage through a small opening. We put on simple dry dressings, renew these dressings frequently, and in the vast majority of instances the wounds heal promptly without any undue expenditure of time. We make the same exception in handling these wounds of which Dr. Peterson spoke. When they do not do well we open up freely as we used to do.

DR. WATKINS (closing the discussion).—To economize time, I will attempt to reply to the discussions collectively and not individually. I am somewhat at an advantage as I have employed this conservative method and have also used the other methods which have been discussed.

After an experience extending over many years with this conservative treatment, the wound has healed in from 25 to 50 per cent less time when I used more radical treatment. Painful and disturbing treatments have been eliminated.

The principle of the general treatment of infections was not included in the paper for lack of time and is not pertinent to the discussion. The rapid general improvement, which Dr. Eden mentioned, which often follows opening an infected wound, is interesting and important. It is, however, not as important as might be inferred, because with the treatment outlined, the rapid change for better is generally as early and as complete as he has mentioned.

The literature and reports relative to the treatment of infected wounds during the war, has failed to add much, if anything, to the treatment of wounds in civil practice. The war wounds were generally contaminated and contained much devitalized tissue. Dr. Frederick A. Besley, of Chicago, who had an extensive overseas service, informs me that he believes that the antiseptic treatment of wounds employed, did more harm than good, but that the use of chlorine solutions was of value when wounds contained much devitalized and contaminated tissue. The digestive fluid recommended by Drs. Reynolds and Byford would probably act much in the same way and is possibly of greater value than the chlorine solutions.

I believe the variety of infections should not determine the kind of treatment to any great extent. There would be less objection to active treatment for a staphylococcus infected than for a streptococcus infected wound, because the streptococcus infection is easily disseminated and embolic disturbances readily follow.

The discussion intimates that I do not drain infected wounds. My contention is that the treatment recommended gives efficient drainage. When the dressings are removed and the patient's position changed, the wounds are found well drained. This favorable result does not always obtain when tubes and gauze are inserted for supposed drainage purposes.

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DR. LILLIAN K. P. FARRAR, of New York, read by invitation, a paper entitled **Acidosis in Operative Surgery and Its Treatment by Glucose and Gum Acacia Given Intravenously.**

Dr. Farrar presented an extended study of this subject based on observations made at the Woman's Hospital of New York. In reviewing the physiologic basis underlying this procedure, Dr. Farrar called attention to the fact that during any surgical operation the acid

by-products of the body are greatly increased. If the bicarbonates of the blood which carry the acid carbon dioxide gas to the alveoli of the lungs are present in large amount, the combining power of the blood, i.e., the ability of the bicarbonates to unite with the  $\text{CO}_2$ , is high and lung ventilation is maintained. On the other hand, if the bicarbonates are low or the acid by-products greatly increased, a condition of intracellular acidosis results which may endanger the life of the patient if the operation be prolonged.

Carbohydrates are necessary for the complete oxidation of acetic acid. Glucose is normally present in the blood and is assimilated in this form without further metabolism. An individual will absorb 0.8 grams of glucose for each kilogram of body weight without the production of a glycosuria and this rate can be maintained for several hours if desired. Gum acacia is a colloid of the same viscosity as that of the blood and, when added in a 6 per cent solution to a 20 per cent glucose solution, will keep in the blood stream the water which glucose attracts from the tissues. A satisfactory blood pressure is thus maintained and the loss of bicarbonates into the circulation prevented. If blood pressure is maintained and the acid by-products completely oxidized, acidosis occurring during operation will be prevented. Salt solutions do not maintain blood pressure, as the salt is taken up by the tissues as the latter attracts the water. A small volume of a higher viscosity such as glucose and gum acacia is therefore preferable because the blood is not diluted and the burden on the heart is consequently lessened.

Dr. Farrar in summarizing the indications for the procedure stated that given during operation it had been found of great value in combating acidosis and preventing postoperative vomiting, in cases of shock where it was necessary or desirable to maintain a normal blood pressure, in hemorrhage and to promote diuresis. In their service at the Woman's Hospital it was given when a patient's resistance had been shown by a preoperative examination to be lowered, where a long or severe operation was anticipated, and in shock or hemorrhage associated with ruptured ectopic or similar accidents. Another class of cases in which glucose was administered with good results after operation included severe postoperative vomiting and in peritonitis where the food value of the solution sustained the patient until able to take nourishment by mouth.

The technic of the procedure included the administration of bicarbonate of soda in doses of from one-half to one dram every three or four hours for two or three days previous to operation. The patient is given a meat-free diet, with starchy foods, fruits, vegetables and an abundance of water. This contributes to the alkali reserve. The injection is made with a salvasan apparatus, using small needles. The temperature of the solution should be  $105^\circ \text{F.}$  as it enters the vein. The quantity of the solution and rate of flow is governed by the patient's weight, thus a woman weighing 100 to 125 pounds can be given 200 c.c. per hour, or about 3 c.c. per minute. A patient weighing 125 to 150 pounds can be given 250 c.c. per hour or about 4 c.c. per minute. These figures are obtained by Woodyatt's method and are applied to every patient. The postoperative diet in acidosis should consist for the first twenty-four to thirty-six hours of the juice of citrous fruits, cereals with cream and sugar (except oatmeal), toast, jelly, honey, malted milk, custard, junket, bread and butter, rice or bread pudding with cream and sugar as freely as desired. Bicarbonate of soda 30 to 60 grains every three or four hours will also assist in lessening postoperative acidosis.

The gum-glucose solution as employed by Dr. Farrar is made from the powdered Egyptian gum Arabic and preferably the anhydrous chemically pure dextrose. Great care must be exercised in its preparation, for the details of which attention is directed to the complete paper which will be published elsewhere at a later date.

#### DISCUSSION

DR. ROLLIN T. WOODYATT, CHICAGO (by invitation).—There is a great tendency in using means of this sort to group certain conditions under certain clinical names, such as shock, acidosis, and so on, without entirely realizing the combination of conditions which may occur in different individuals; that is, one case of shock is not necessarily like another one; hence a clear understanding of the basic principles underlying the use of these agents is important.

Gum acacia, glucose, and salt are all similar to each other in one respect, as Dr. Farrar has pointed out, in that they all have high hydration capacities and will hold water in combination with themselves. Whether in the bowel or kidney tubules, you will find these substances associated with water and, of course, as they pass into the blood stream they accumulate water in the blood creating the condition of hydremic plethora. Thus they increase blood volume. But these substances also differ in other respects.

An inorganic salt, like sodium chloride, when introduced into the blood passes rapidly from the blood into the tissue cells, and being nonoxidizable, rapidly reverses the initial hydremic plethora and replaces it with hydrops of the tissues. Glucose differs from salt in the respect that after passing from the blood into the tissues it undergoes utilization (oxidation, storage) and does not accumulate as unchanged glucose in the tissues. Instead of exhibiting the hydrops producing action of salts in the tissues, glucose substitutes for these the beneficial chemical effects which result from its utilization and, as Dr. Farrar has stated, these include the increased storage of glycogen, an increased energy in nonstriated muscular fibers and increased tone, so that following glucose injections it is not uncommon to find a marked increase in the tone of the musculature of the alimentary tract from the stomach down, an effect resembling, though not quite so striking, as that of pituitrin. Gum acacia has a certain advantage over salt in that it does not diffuse into the tissues so rapidly. It therefore cannot accumulate in the tissues but remains in the blood and holds water in the place where it is wanted. It has a certain advantage over glucose, owing to the fact that after having been introduced into the blood stream all at one time the supply need not be maintained by continuous injection. It does not take the place of glucose in all respects because it exhibits none of the chemical effects of glucose in the tissues. Therefore, a combination of gum and glucose is a rational procedure.

I personally have not used gum acacia, but have been more concerned with a technic enabling us to sustain the effects of glucose as long as we wanted them by an apparatus which permits the continuance of injection for an indefinite time. Basing my remarks on the use of glucose without gum I would emphasize a point brought out by Dr. Farrar, to the effect that the increase in blood pressure, both in its height and duration, is greater than that obtainable with sodium chloride. The improvement in the condition of the patient in shock and shock-like states, particularly when there has been considerable dehydration, is more marked following glucose injections than after the use of salt solution alone, and with glucose there is no subsequent reversal of the first effect on the blood volume. So far as it goes and while it lasts the effect of the glucose is an unmitigated good. Salt has a transient effect on the blood volume and a doubtful effect on the mean arterial pressure followed often by hydrops.

In cases of resection of the bowel, in certain cases where there has been stenosis of the pylorus, with marked dehydration or failure of the body to absorb the water it takes in by the alimentary route, also in cases of "transudate" into the stomach, persistent vomiting with dehydration fever and starvation, and in several other conditions, we have obtained results with glucose which cannot be obtained by other known means.

A point which would appear to be of particular interest in relation to the gynecological operating room is the frequency, as you undoubtedly know better than I do, with which in conditions associated with pregnancy that type of acidosis occurs in which the acid accumulation is not due simply to tissue asphyxia, as in shock, but in which it is due to that derangement of metabolism which you see in fasting and in diabetes, namely, acidosis having its origin in the fatty acids and associated with acetoacetic and betahydroxybutyric acids in the urine. This type of acidosis is specifically combated by the administration of glucose.

So as to attain the best results with intravenous injections, it is desirable to take up in each case the several items—blood pressure, blood volume, plasma bicarbonate, the water reserve of the body, the degree of starvation, etc., and then to make an intravenous prescription for the individual case, carrying the treatment toward definite ends. Where the main lack is water, use a 3 or 4 per cent glucose solution; for a shock-like state without dehydration, use a hypertonic solution. If there is a very low bicarbonate reserve, add enough bicarbonate to restore it to normal and make the solution and the rate of its injection fit the case.



DR. FREDERICK J. TAUSSIG, ST. LOUIS, MISSOURI.—I should like to report briefly concerning two of my cases of postoperative shock treated by Dr. Erlanger with gum-acacia-glucose solution and included in his report on this subject. Both of them have a certain interest and lesson. The first of these was of a large abdominal tumor, a fibroid, filling the entire abdomen, and with it, an infected ovarian cyst. It was a most difficult operation in a woman whose kidneys were in bad shape, but by advice of the internist I decided to do this rather hazardous operation. Previously I had consulted Dr. Erlanger, feeling it was a case suitable for gum-acacia-glucose injections. The blood pressure within twenty minutes after the operation was begun, fell to below 100, the pulse became rapid and imperceptible, and Dr. Erlanger proceeded to inject the solution. As you may know, he uses a stronger solution of gum acacia, 20 to 25 per cent, and a little bit higher glucose also. Within twenty-five minutes the pulse pressure which had fallen to three and one-half millimeters and the blood pressure ranging from 60 systolic to 50 diastolic as registered on the apparatus for that purpose, rose to 90-65 blood pressure, and pulse pressure from 6 to 7 millimeters. The patient at the time she was removed to her room was in as fair condition as one could ordinarily expect any woman to be after a laparotomy. Unfortunately this patient twenty-nine days after operation died of pneumonia.

The second case is perhaps of greater interest because it points to the importance of the use of these solutions in cases of hemorrhage. A cervical cancer had been removed by a paravaginal operation and on the second day after operation the patient had a severe hemorrhage. The patient's condition was such that she rapidly became exsanguinated, and I was unable to attend her just at this time. Dr. Erlanger was communicated with and he felt it was a case for treatment with blood transfusion. According to the statement of the interne, a resident donor could be obtained within the period of half an hour. Unfortunately this interne was mistaken in his statement, because it was not until three hours later that a donor was found, and by that time the patient was in a dying condition.

The conclusion Dr. Erlanger draws in those cases where a blood transfusion is evidently necessary is that the gum-acacia-glucose solution injected at once will hold the patient until such time as a donor may be available and will only add to the probability of recovery.

DR. ROBERT T. FRANK, NEW YORK CITY.—My experience with gum-acacia-glucose solution was an acute one. It was in an evacuation hospital, where at one period of the conflict the patients came in with all degrees of shock, due to all possible reasons for producing shock. I include cold, exposure, hemorrhage, infection, starvation, dehydration, and so forth. We at first treated them with salt solution. I am leaving out the other treatments of shock, only referring to those which are distinctly applicable to this discussion. An order was later issued to use gum acacia with glucose. We were asked to employ quantities varying from 700 to 1000 c.c. Without having any time or opportunity for making a scientific investigation, a large number of men who were in charge of these cases separately came to the conclusion that harm was being done by these injections. We thereupon gradually reduced the amount of injection to a maximum of 400 c.c., and our results were better. However, we finally came to the conclusion that transfusion was far superior to any of the artificial sera which had been used. I exchanged opinions with other men from other organizations who arrived at the same conclusion.

DR. BENJAMIN P. WATSON, TORONTO, CANADA.—We have been using the gum-acacia solution now for nearly a year. We are fortunate in Toronto in having Dr. Keith who did a great deal of original work for the British Commission during the war, and we have come to replace normal salt solution entirely by gum-acacia solution.

Our experience with saline solution in shock and hemorrhage has been that you can raise the blood pressure at the time, and that blood pressure would be maintained for two or three hours, then there would be a sudden fall and a beginning state of shock again, requiring a later transfusion. We know that 25 per cent solution has been used by Dr. Erlanger, and with that percentage we find the blood pressure can be immediately raised. We had a case of ruptured ectopic pregnancy with the blood pressure down to 80 or 90 systolic and then brought it up to 120 systolic during the course of the operation, and that pressure was maintained.

We have had four cases where we followed the blood pressure right through a period of eight or ten days following operation and in none of these four cases did the blood pressure fall more than 6 points from what it originally reached at the end of the transfusion. To one we gave a second transfusion with the gum acacia. When this is combined with glucose in certain of these alarming cases, the effect is marvelous.

I will mention one severe case of hyperemesis. The patient came in in a condition of great collapse, a blood pressure of 90 systolic, and a low pulse pressure. She was very ill at the time. We gave her glucose solution slowly. She had it throughout the whole night. Her condition was so greatly improved, although vomiting continued, that we were able to empty the uterus. The patient ran a very long convalescence; she required repeated transfusions of glucose; she also had transfusions of blood. Ultimately she made a complete recovery and I am certain the patient never would have survived had we not had this means at hand for treating her.

One important thing in the gum-acacia solution is the method of preparation. A great many poor results have been due to bad preparations of the gum. We must use a pure preparation of the gum acacia, if possible. The solution must be carefully made. The water used must be freshly distilled water and the sterilizing of the solution in the autoclave must be carefully done. The solutions can be put up in greater strength and kept in the operating room and rapidly diluted at the time when they are being used.

I think it is most opportune that a subject like this has been brought before a large body of operating surgeons.

DR. GEORGE GRAY WARD, JR., NEW YORK CITY.—The studies we have been making at the Woman's Hospital, as presented to you by Dr. Farrar, have been carried out with difficulty. Dr. Farrar has worked under the greatest handicaps. We found at first that we could not rely on the  $\text{CO}_2$  estimations with the Van Slyke method in our laboratory in spite of having a full-time laboratory man available, because of the great amount of work called for by the routine work of the hospital. For that reason, we obtained a technician from the Rockefeller Institute who made these investigations so that they would be of value.

The gum-acacia solution, when we first tried it, was a failure from the fact that it was not properly prepared. It was not until we went to Toronto and saw it used there and got from Dr. Watson the exact technic in the preparation, which requires considerable care and many filtrations, that we had a satisfactory solution. There is no question in my mind as to the value and clinical effect of this method in cases of severe operation. The patients show remarkably little reaction compared to the other cases, notably in those cases Dr. Farrar spoke of in which a Wertheim operation was done and attended with considerable shock. One of the important things one must understand is that the administration intravenously of gum acacia is given throughout the operation by a slow method, as pointed out by Dr. Woodyatt, who has devised a special apparatus. Unfortunately this costs three or four hundred dollars and we could not get one, but we regulated the flow through needles and stopcock as well as possible, giving a slow continuous administration from the commencement of the operation. I think it might make a difference in the results if the solution were given very rapidly as one would give ordinary saline infusion. Perhaps that may account for the differences Dr. Frank observed in the army where they did not have the time for proper administration, but gave it as they would give the ordinary infusion. The high percentages used in the army may have made a considerable difference also.

The combined use of gum acacia and glucose, as suggested by Erlanger, is theoretically correct, and from our cases it would seem to be borne out clinically. Our results confirm the findings of Cannon that the blood pressure is a valuable index as to the  $\text{CO}_2$  content, as regards acidosis. Instead of it being necessary to use the Van Slyke method, if we take the blood pressure throughout the operation, we have all the time an index as to the degree of acidosis, which greatly simplifies the practical study of the problem. We used a special stethoscope for that purpose and had readings made during these operations.

A point that Dr. Woodyatt made is very important, namely, that glucose energizes the muscle so that the muscle becomes tonic, as it were. This I think is shown in the rather free passage of flatus after the operation in these cases, from stimulation of the intestinal muscle, and there is also in addition quite a marked diuresis, as one would expect.

I wish to confirm the point made by Dr. Watson in severe vomiting. We had that borne out in our cases, where we could not relieve persistent vomiting until we gave glucose intravenously.

DR. GEORGE GELLHORN, ST. LOUIS, MISSOURI.—Is it possible to increase before operation the alkaline reserve of the organism to such an extent as to prevent acidosis?

DR. J. WESLEY BOVÉE, WASHINGTON, D. C.—I wish Dr. Farrar would give us more definite information as to the rapidity of the current in this slow process.

DR. JOSEPH B. DELEE, CHICAGO.—How often do rigors occur after these administrations?

DR. GEORGE W. KOSMAK, NEW YORK CITY.—The method Dr. Farrar has described is undoubtedly a valuable one, but as a matter of practical application, would it be possible to substitute some other point of entry for the glucose?

I have for several years given glucose solutions (5 per cent) by rectum after operation in doses from 6 to 8 ounces at intervals of two or three hours and consider that I have had better results than with the use of salt solution for that purpose.

I would like to know whether in ordinary practice we cannot substitute the rectal administration of the glucose and whether it would not be of the same value?

DR. FARRAR (closing the discussion).—First of all, I want to thank Dr. Woodyatt for coming here and discussing this subject because it is really the physiologist upon whom we must depend to know what to put in a patient's blood.

Dr. Frank spoke about the results obtained in the army in giving gum acacia intravenously. One must find out exactly what can be put in the blood before one can obtain good results and it is only with the help of the physiologist that this can be done.

One of the speakers said that he had used a 6 per cent solution of glucose and that he had had only an occasional favorable result with it. I have kept to the 20 per cent glucose because of Dr. Woodyatt's findings, and have been guided entirely in glucose feedings by his work in the laboratory.

It was found by a special investigation committee in Great Britain, which did so much in trying out salt solution in hypertonic strength, and bicarbonate of soda which Cannon advocated, that dilution of the blood was not a good thing and if long continued was even harmful and that there was no especial advantage to be gained by it.

The thing of real importance was to get a solution which corresponded to the viscosity of the blood and that is what 20 per cent glucose and 5 per cent gum acacia does.

That brings up the question of rigors and chills. We have not seen any in this series. Two women who were given glucose intravenously in the ward for acidosis by an interne who did not appreciate the necessity of keeping to the rate although he had been told, did have chills but these were not operative cases. There were absolutely no chills or rigors in the other cases. There has been absolutely no case of infection or necrosis of tissue. We have had no bad results of any description.

As to the question of putting up the solution in a higher strength and diluting it, a point brought up by Dr. Watson, we find it more convenient to put the solution in flasks of 250 c.c., that means 50 grams to the flask, which is what we can give the average patient in an operation of one hour.

The technic is simple. An apparatus such as is used for giving salvarsan is prepared. The stopcock on the tubing regulates the rate of flow and an infusion thermometer in the tubing indicates the temperature, which should be 105° F.

With reference to the question of absorption of the solution by rectum, glucose is not absorbed by the rectum faster than 1.8 gms. per hour. The great value of glucose



lies in its introduction into the blood. It is not altered by the liver, it goes into the tissues and it has a far greater effect than glucose put into the stomach or bowel.

As to the prevention of acidosis, which was spoken of by Dr. Gellhorn, I could not take it up in the limited time at my disposal. It is possible to do a great deal towards prevention of acidosis by proper feeding of the patient beforehand. We can bring the alkali reserve up by giving the patient a protein-free, carbohydrate diet, and we can accomplish some good by the administration of bicarbonate of soda before the operation, but the great drop that occurs during the operation cannot be offset unless we do something at that time and the beneficial effect is then directly upon the tissues themselves just as Dr. Woodyatt has said.

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DR. THOMAS WATTS EDEN, of London, England, a guest of the Society, presented a lantern slide demonstration of certain **Transition Stages from Benign to Malignant Conditions in the Ovary, the Tubes and the Vulva.** (The explanatory text and the descriptions of the more important sections shown by Dr. Eden, will be found on page 11.)

#### DISCUSSION

DR. ROBERT T. FRANK, NEW YORK CITY.—Dr. Eden has given us a very beautiful exposition of the transitional stages from nonmalignant to malignant conditions which can be observed in the ovary, in the uterus, cervix, and vulva. If to these he had added the inflammatory conditions of the tube with carcinoma following, and the sequence which we see in pregnancy, normal placenta, hydatid mole, chorio-epithelioma, he would have given us an absolutely complete view of the difficulties which confront the pathologist and secondarily also the clinician.

I cannot differ in a single word with what he has placed before you. His position is in marked contrast with that of a gentleman who recently published an article on the precancerous uterus in which, for instance, he quotes a case of chronic endometritis which he regards as adenomatous and says this woman, five years later developed cancer of the uterus. In a similar way he quotes a case of cervical polypi, followed in eight years by carcinoma.<sup>1</sup> If one is willing to extend the term precancerous to a period of time such as that, I am unable to follow either in conception or in argument.

As Dr. Eden has said, leucoplakia of the vulva or vagina is distinctly precancerous. Whether erosion can be explained from an inflammatory point of view or should be regarded as an adenoma, or at times be classified as a precancerous condition, I am unwilling to say. But the question I desire to ask most emphatically is this: Are we going to do more harm in operating upon the advice of a radical pathologist, or by watching and waiting if our clinical judgment in extremely doubtful cases restrains us? I am proud to say, in several instances I have been able to save the uterus and other parts of the genital tract from unnecessary mutilation where on slender evidence, such as Dr. Eden would reject, pathologists have advocated radical operations for epithelial overgrowth, for specific erosion, etc. I believe with an operative mortality from radical operation of at least 10 per cent or more, less harm will come in watching these cases with sane clinical judgment backed up thoroughly by good pathology.

The exposition you have heard of these transitional stages was most beautiful and illuminating.

DR. HOWARD C. TAYLOR, NEW YORK CITY.—This subject is rather difficult to discuss for one who is doing work largely clinical and comparatively little in the laboratory. When Dr. Eden left out the word precancerous, he took out most of my discussion.

A short time ago I had an opportunity to talk with a man who has one of the largest clinical laboratories in New York; a man who is doing extensive work for the best men,

<sup>1</sup>McCann, F. J.: The Precancerous Uterus, *Proc. Roy. Soc. Med.*, London, 1919, xiii. Sect. Obst. and Gynec., 3.

and who made the statement that physicians at the present time were relying too largely on clinical findings. In fact, he said, at times he was afraid to send out a report of a case in accordance with the findings, and he called attention to the question of precancerous lesions.

In talking with Dr. Stone who read a paper two or three years ago before this Society on precancerous lesions, he stated he had come in contact with a man who, as a result of reading his paper, was doing hysterectomy on account of irritated cervixes, with the idea that it was a precancerous lesion. The head of the laboratory in New York made that same point; that if he turned out a report that a certain condition showed a precancerous lesion to a certain type of man, that man would be apt to do an extensive operation on that diagnosis which, of course was the right thing for the patient, but was not intended by the laboratory worker.

We all know how discouraging the cancer problem is. If a case of cancer comes into our hands early, there is no doubt a great deal of good work can be done by the proper treatment of these so-called precancerous conditions.

Precancerous is an old word which has recently crept into clinical work and is much misunderstood. As it is used and intended by Dr. Eden, it is different from the meaning applied to it clinically.

As Dr. Eden has said, so far as the ovary is concerned, very little can be done. When we make our diagnosis it means ordinarily that the organ has been removed.

I think the word precancerous as it is used by some laboratory men, brings out the fact that it is a condition which is somewhat in dispute. One pathologist will say that the lesion is benign and another will say it is malignant; in other words, it is a sort of intermediate stage between the two. With a condition of that sort it is difficult for the clinician to know what to do. As a matter of fact, we are prompted to decide very largely on the clinical findings influenced by the age of the patient and by her symptoms rather than on the pathologic report.

So far as the cervix is concerned, I think it is undoubtedly true as Dr. Eden has stated, it is the lacerated cervix with erosion in the multiparous woman rather than in a nulliparous woman which is the cause of the trouble. That, however, is a very close decision to make in the case of a woman who is at or near the cancer age, and it seems to me, the only practical way of treating these cases is to go on the basis that any lesion in that organ or neighborhood should be healed, and that ordinarily means removal by operation rather than by applications of caustics or cauterization by heat.

DR. FREDERICK J. TAUSSIG, ST. LOUIS, MISSOURI.—I wish to confine my remarks solely to the question of precancerous conditions of the vulva. Some four years ago I presented before this Society a short report upon an etiologic study of vulvar cancer which dealt in some degree with this question. Since that time I have had occasion to have quite a considerable amount of additional material come to me for microscopic study, and I have recently made a report of 20 cases of leucoplakic vulvitis and 27 cases of vulvar carcinoma from which I believe certain deductions can be drawn. Prior to this study I made an analysis of 100 cases of normal involution of the vulva in old women. Rather to my surprise, I found that in about 20 per cent of these old women, with an average age of 65, there was a complete obliteration of the labial folds and the clitoris was practically absent; therefore, the emphasis that has been laid upon such an obliteration in the past in the term "kraurosis" is not to my mind justified. Berkeley and Bonney have been working on this subject and their views are extensively presented in Dr. Eden's very interesting and complete three volume work on gynecology. These men have really gone into the subject more completely than any other previous investigators, and their views are practically identical with what I have found. Kraurosis is a different thing from leucoplakic vulvitis. It is an obliteration of the labial folds and clitoris with at times some abrasions, but not having that essential histologic factor, namely, the absence of elastic tissue in the dermis. Leucoplakic vulvitis is an interesting and unusual histopathologic condition, for besides the changes mentioned in the epidermis, by Dr. Eden, I believe even more important are the changes in the dermis itself. In none of the cases

I have studied was the absence of elastic tissue from the upper layers of the dermis noted. Dr. Engman, our dermatologist, is also convinced that this absence of elastic tissue was the primary factor in the condition, probably in some degree secondary to the absence of corpus luteum, because all these cases, or practically all of them, were in women past the menopause. As a result of the absence of elastic tissue there occurred a greater friability of the tissues, an increased tendency to slight breaks, and, because the epidermis cracks, the infecting organisms connected with the infection gain entrance from without and a pruritus begins. Thus the process grows worse; the epidermis becomes thickened, we see a picture such as Dr. Eden showed in one of his slides, with prolongations, and in that stage the tendency to carcinoma is, of course, greater than in any other. I do not think, however, that Dr. Eden is justified in assuming that the last picture shown, where there was a glairy appearance of the dermis, is a stage of healing. I presented before this Society four years ago a similar slide of a section where the epithelium was thinned out but the dermis showed that malignancy was developing. Therefore, such malignancy can occur in this later stage, although not as frequently as in the proliferating stage.

DR. JOHN G. CLARK, PHILADELPHIA.—A point which has been brought out in this demonstration is the necessity primarily for controlling the microscopic diagnosis by clinical judgment.

I have been particularly impressed recently with the attitude of Dr. Ewing, of New York, in this matter. Dr. Ewing is one of the most level-headed pathologists we have in this country. He takes the position that in a questionable case a man is operating against clinical judgment; he is not willing to declare in a questionable case whether the disease is or is not malignant. He made the statement that a clear, nonmalignant history was a good thing and would go far as a final factor in diagnosis. For that reason, two things are paramount. First, a history of the case, and secondly a pathologist who controls our ultimate clinical work. In this respect our attitude should be more or less the attitude of a special society whose members can finally determine when or when not to operate much better than the general practitioner can. On the same principle I believe every good laboratory should be controlled; that every good operating room should be controlled by a special pathologist, for the reason that frequently we see a difference in diagnosis between the best general pathologists. For example, a pathologist in the University of Pennsylvania, in a case with a perfectly clear nonmalignant history, gave the opinion that the disease was positively carcinoma, although the clinical evidence was against it, and when the question was put up to us we simply said, we will not operate. The subsequent history of the case showed positively that our clinical judgment was accurate and not the judgment of the pathologist.

DR. FRED L. ADAIR, MINNEAPOLIS, MINNESOTA.—Some years ago I spent considerable time in going over a large number of cervixes, particularly in relation to erosions around the external os. Aside from the so-called congenital erosion, which has no particular place in this discussion, the erosions seem to originate from a combination of inflammation, maceration and traumatism. It seems to me, that this point is of importance in connection with the subsequent history of some of these cases of erosion. Most of these erosions develop in association with parturition, or in some cases from inflammatory conditions which involve the cervix. In order to avoid the development of these erosions into malignancy, early treatment should be instituted. This can be done by proper supervision of the obstetrical cases and the early treatment of these erosions by the elimination of those different factors which enter into the individual cases, namely, the traumatism, inflammatory processes, and the maceration. The columnar epithelium is better able to resist these factors than the squamous epithelium, particularly maceration, and that is the reason erosions occur. After some of these factors have subsided the squamous epithelium seems to have greater resistance and is better able to survive, I was able to demonstrate definitely in some specimens that in the process of healing there is no metaplasia or transition of the columnar epithelium into squamous epithelium, or of the latter into columnar epithelium. This can be distinctly demonstrated by differential staining with mucocarmine, showing squamous epithelium growing underneath the columnar. This takes place not only on the surface,



but it grows down into the glands underneath the columnar epithelium. In some instances I was able to show complete Nabothian cysts which were lined with squamous epithelium, in which the columnar epithelium was either partially or completely replaced by squamous epithelium, not by metaplasia but by definite undergrowth of squamous epithelium. That metaplasia can occur I am not prepared to dispute, but that it is usual in the process of healing in this condition, I do not think is true.

These erosions present a most fascinating picture because of the varying proportions of epithelium and glands. This comprises a very fruitful field for studying the transitional changes between the ordinary simple erosion and malignancy.

DR. JOSEPH BRETTAUER, NEW YORK CITY.—From a clinical point of view, we all subscribe to what Dr. Clark has just said. "Cancerous age" as a specific age ought not in my opinion be used. There is no such age. We see cancers from the age of fifteen up to the postclimacteric period.

DR. JOSEPH B. DE LEE, CHICAGO.—No one has said anything on the obstetric side of these conditions that have been demonstrated on the screen. I am prompted to say that if obstetricians devoted more care to their obstetric cases they would not see so many lacerations and erosions which may or may not ultimately develop into cancer. If practitioners will observe certain rules there will be fewer lacerations and erosions, especially not to dilate the cervix with the fingers when they do not have to. Second, not to give pituitrin. Third, not to use bags. Fourth, not to infect the woman, and fifth, if lacerations should occur, repair them at once.

DR. GEORGE GELLHORN, ST. LOUIS.—In general surgery and in dermatology the actual transformation of syphilis into cancer has been a long established fact, but in gynecology such a transformation is thus far only a matter of surmise.

I would like to show three slides which may throw some light upon the histogenesis of genital cancer upon the basis of syphilis.

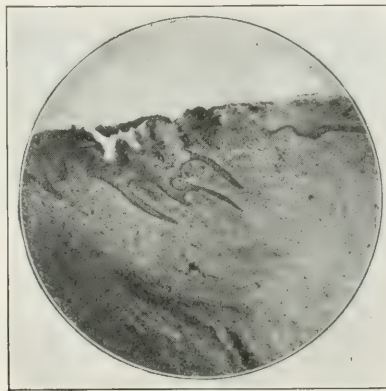


Fig. 1

The first picture (Fig. 1) is from an old syphilitic ulcer of the vestibule described in Dr. Ehrenfest's and my report before this Society four years ago. On the right side there is normal pavement epithelium; underneath a zone of infiltration of lymphocytes and plasma cells which may be noted as gradually thickening toward the middle of the picture, with enormous proliferation of blood vessels with thickened intima. On the left side there is a curious proliferation of pavement epithelium which sends out long slender processes into the underlying tissue, a picture suggestive of cancer were it not for the fact that these processes do not extend beyond the area of lymphocytic infiltration. Furthermore, the basal layer of this epithelium is perfectly normal and the basal membrane is nowhere broken through. The case was subjected to treatment and a few weeks later, when a second excision was made, the epithelium showed normal characteristics.

Figs. 2 and 3 were taken from a paper by Rohrbach, dealing with a case of an old luetic ulceration of the labium majus. Here there is also a very large proliferation of pavement epithelium, and in the area of lymphocytic infiltration there is an isolated nest of epithelial cells which, on serial sections, was found not to be connected with the surface epithelium ( $x$  in Fig. 2).

Fig. 3 shows an entirely different aspect of the same case. The processes of epithelial cells extend into the underlying stratum and the normal epithelium is greatly altered. The basal membrane is broken through. The cell contours are no longer clearly defined. The nuclei have lost their staining qualities and are vesicular.

This, then, is a picture which corresponds in all details with that given by Ribbert of the earliest stages of epidermal cancer. The reason why Rohrbach's diagnosis was the same as in my first case was that the proliferation did not extend beyond the zone of lymphocytic infiltration into preformed tissue. This case was also subjected to energetic treatment, and within a short time, the pathologic changes had disappeared. The fact that many of these

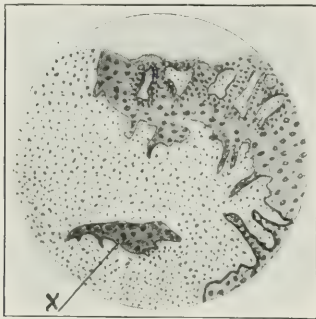


Fig. 2

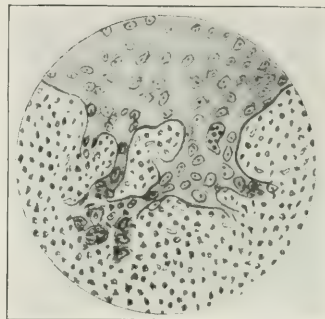


Fig. 3

cases are subjected to treatment seems to prevent the actual transformation of syphilis into cancer. If, however, such cases are neglected, there is every reason to assume that in a fairly large proportion of them the actual transformation of syphilitic into carcinomatous tissue takes place.

DR. EDEN (closing the discussion).—I was much interested in Dr. Adair's remarks. I did say in describing erosion, it was formed by the stratified epithelium giving way to the columnar epithelium, not a metaplasia. I said there was only one sort of metaplasia so described, and that was one in which some day we would be dealing with a healing erosion or early cancer.

I am very much in sympathy with Dr. Clark's position. I suppose all of us have suffered at the hands of the general pathologist. There is no doubt that for gynecologic pathology a man needs special training. I was especially glad he pointed out the importance of keeping the laboratory work and clinical work in close association.

I feel I really ought to apologize for talking to an audience of clinical men about the pathologic side, but I do think that men who operate ought to know what they see when they look down a microscope.

I have not given you any abstruse details of histology, but such points as we have been discussing we ought to be in a position to settle ourselves. While we cannot escape seeking the help of the pathologist from time to time, I think clinical gynecologists who run large services ought to be able to do most of the histology themselves.

*(To be continued in November issue.)*

# Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

## Collective Review

### The Prophylaxis and Treatment of Puerperal Infections

(A Critical Review of Recent Literature)\*

BY HUGO EHRENFEST, M.D., F.A.C.S., ST. LOUIS, MO.

The importance of the problem of puerperal sepsis is succinctly stated by Krusen<sup>1</sup>: While in the opinion of the medical profession and of the laity the number of deaths from puerperal septicemia is fast decreasing, many eminent obstetricians have shown that outside of well-managed hospitals there actually has been no great reduction in totals or in the rate of deaths. It is high time that obstetricians teach, by precept and example, the gospel of puerperal complications. DeLee, never tiring in his efforts to bring the profession to a proper realization of the seriousness of the situation, says in a discussion of everyday obstetric problems: "Taking everything into consideration I feel sure that the statement cannot be contested that 8000 women die annually in this country from puerperal infections." The same discouraging situation apparently also exists in Europe. Quoting an English writer, Brock<sup>2</sup>: "If results are properly gauged by accurate figures, as those offered in the British health statistics, then it must be admitted that the mortality rate from puerperal sepsis shows only a small reduction. A study of these returns for the past seventy years reveals a death rate for some of the earlier years almost identical with that of some recent years." Grace L. Meigs<sup>3</sup> made for the Children's Bureau of the U. S. Department of Labor a thorough study of maternal mortality from all conditions connected with childbirth in the United States and certain other countries. In the summary we find among others the following statements: "In 1913 in this country at least 15,000 women died from conditions caused by childbirth; about 7000 of these died from childbed fever, a disease proved to be almost preventable, and the remaining 8000 from diseases now known to be to a great extent preventable or curable. Physicians and statisticians agree that these figures are a great underestimate. In 1913 childbirth caused more deaths among women fifteen to forty-four years old than any disease except tuberculosis."

"Only two of a group of fifteen important foreign countries show higher rates from this cause than the rate in the registration area of the United States. The rates of three countries, Sweden, Norway, and Italy, which are notably low, prove that low rates for these diseases are attainable. The death rates from childbirth and from childbed fever in this country apparently are not falling to any great extent. Indeed, during the thirteen years from 1900 to 1913 they have shown no demonstrable decrease."

"These facts point to the need of higher standards of care for women at the time of childbirth. Improvement will come about only through a general realization of the necessity for better care at childbirth. If women will demand better care, physicians will provide it, medical colleges will provide better

\*Elaborated from a paper read at the Meeting of the American Gynecologic Society, Chicago, May 24-26, 1920.



training in obstetrics, and communities will realize the vital importance of community measures to insure good care for all classes of women."

Reading these lines one cannot suppress a feeling of wonder why the women of this country, who must be credited with most of the notable achievements in child welfare, have not yet awakened to the import of this serious problem of their own welfare. It does not seem fair that the medical profession, by assiduous and effective propaganda, has familiarized them with the perils of cancer, but at the same time has concealed from them the greater risks of childbirth. It is a disingenuous procedure to extol the attainments of modern surgery and to hide the lamentable deficiencies, not of the science, but of the everyday practice of obstetrics.

#### PROPHYLAXIS

Is puerperal sepsis an entirely preventable disease? Probably not. Zange-meister and Kirstein<sup>5</sup> a few years ago advanced proof that the vagina contains saprophytes which occasionally ascend into the uterus. Thus nobody directly connected with the delivery may be actually responsible for the infection. Loeser<sup>6</sup> more recently investigated most thoroughly the problem of the latent infection of the birth canal. Much work has been done in the past to study the invasive faculties of all vaginal bacteria, including the anaerobes, always with particular consideration of the streptococci. The results of these various investigations, in general, concur in the fact, that but few of the bacteria of the vaginal flora are true saprophytes, that the majority of them, under favorable conditions, might exhibit pathogenic characteristics. Loeser assumes that in the genital tract of women during the reproductive age conditions change so often and so greatly, that conditions favorable for the development of pathogenic characteristics by some of the vaginal microorganisms are likely to prevail at some time or another. Therefore, it is justifiable, and possibly preferable, to admit the existence during pregnancy of a state of latent infection. This assumption obviously does not exclude the possibility of an added exogenous infection as the result of careless manipulations, etc. The traumatism of labor, open wounds, presence of blood, etc., represent circumstances, most propitious for bacterial growth. If in the vagina, where, as a rule, innumerable varieties of bacteria live as saprophytes in harmonious symbiosis, one particular bacterium is found in pure culture, the deduction seems justifiable, that conditions prevail which facilitate the development of this one form at the expense of all others. Loeser feels that the assumption is warranted, that these also might be the conditions under which this particularly favored bacterium also develops virulency, or an increased virulency. In this manner it might be explained that latent microbes, and not by any means only streptococci, will suddenly assume the characteristics of aggressiveness. In regard to streptococci in particular, it seems probable that the change of the chemic reaction of the vaginal discharge from the normally acid to alkaline after labor, enables them to manifest their innate quality of invasibility which is inhibited, as well known, by growth in acid media. Only bacteria which are pathogenic or become so under certain conditions are capable of provoking the production of defensive antibodies in the invaded human organism. Therefore, the presence of agglutinating substances proves the pathogenic character of the bacterium, or indicates a state of latent virulency if the characteristic clinical symptoms of an infective process are absent.

Another type of puerperal infection, not entirely preventable, but fortunately rare, is that due to the tetanus bacillus. Spiegel,<sup>7</sup> from an analysis of 66 authentic cases of puerperal tetanus, recorded in literature, concludes that the tetanus bacilli enter the circulation either from the endometrium or from perineal wounds. The prognosis of this disease is entirely dependent upon

its early recognition. Immediate institution of the serum treatment yields most satisfactory results, especially in the more chronic cases in which the symptoms develop gradually until about the fourth day the first typical severe convulsion occurs.

In the light of recent advance of our knowledge concerning focal infections their possible relation to puerperal fever is worthy of careful study. This problem is discussed by Talbot.<sup>8</sup> Although he argues only theoretically on the problem, without advancing a single convincing proof, one must agree with his general conclusion, that from a prophylactic point of view it is incumbent upon the obstetrician to examine every pregnant woman to ascertain whether such a focus exists, and to have it removed before it possibly could do harm. In a similar manner, Davis<sup>9</sup> refers to the intestinal tract as a potential source or seat of an infectious process that might complicate pregnancy or the puerperal state.

Contradictory views will be found in literature (and textbooks) concerning the importance of the duration of labor after rupture of the membranes in the etiology of endogenous puerperal infections. This problem is the subject of a very comprehensive paper contributed by Rohde.<sup>10</sup> He concludes that both in women who have, and those who have not, streptococci in the vagina, the duration of labor after the escape of the amniotic fluid does not play a rôle worthy of consideration in the causation of fever, during and after labor, and in puerperal mortality. Rohde presents so many carefully arranged tables covering several thousands of cases, on which he bases his conclusions, that it seems fair to assume that he has definitely settled this question.

Another most noteworthy fact is recorded in a paper by Slemons.<sup>11</sup> Extensive statistics indicate that in from 2 to 3 per cent of cases a rise of temperature above 101° F. can be noticed during labor. In severer cases, after delivery the fever continues. There has never been any doubt that in this group the intrapartum complication is dependent upon a bacterial infection.

In the other group of milder types, probably in the majority of cases, the rise of temperature passes unnoticed. As a rule, the fever is ascribed to the effect of prolonged and violent uterine contractions. Warnekros (in 1913) established the fact that also in these cases the rise of temperature is of bacterial origin. Out of a total of 25 febrile women in labor he obtained positive blood cultures in eighteen.

Slemons extended the search for the source of this infection to the placenta which he studied in stained sections. Most conclusive evidence was thus obtained for two facts: First, that intrapartum fever, unless attributable to some accidental cause such as tuberculosis, is due to a placental bacteriemia, secondly, that this infection does not proceed from the maternal circulation into the villi, but vice versa. The bacteria evidently enter the placenta by way of the amniotic membrane and the amniotic fluid. Generally the latter becomes infected, because the membranes had ruptured prematurely (which is not in accord with the findings of Rohde quoted previously), labor prolonged, and repeated vaginal examinations had been made. Since in these cases the placental infection usually is limited to the amniotic surface of the organ, the complication is likely to prove more serious to the fetus than the mother. It probably often is responsible for the fetal death.

Hematogenous contamination of the amniotic fluid may occur in any case of maternal septicemia, as has been emphasized by DeLee and also Curtis, but more common is the ascending type of infection.

In regard to their prognostic value, Slemons expresses the opinion that positive cultures, obtained during labor, are of no value, while in the puerperal state negative cultures signify a more favorable prognosis than positive ones.

Broek,<sup>3</sup> already quoted, like Slemons emphasizes the great advantage of



avoiding frequent internal examinations. Careful prenatal study of the patient makes this possible. It might be mentioned in this connection that the German literature of the war years contains many articles praising the superiority of external abdominal, and rectal over vaginal examinations during labor. The absolute lack of rubber gloves forced German and Austrian physicians to find a substitute for vaginal explorations.

Other necessary changes in the customary obstetric technic in the interest of a better puerperal prophylaxis are advocated by Berry Hart.<sup>12</sup> Much more care should be taken in preventing perineal lacerations. Crede's method of expression of the placenta, in his belief, is a very serious error in the management of labor. It tends to leave pieces of tissue attached to the uterine wall, because the placenta is forcibly removed before it had become completely separated.

The very satisfactory results of prophylactic, active immunization with specific sera and vaccines in many of the acute infectious diseases prove the feasibility of similar efforts to obtain effective immunization against streptococic puerperal sepsis. Joetten<sup>13</sup> discusses the literature on this subject, and acknowledges the final failures of all previous attempts. He prepared a vaccine from six different strains of streptococci cultured from septic puerperæ. Experimenting with a gradually increasing dose of from 25, 50, 100, 250 up to 500 millions of bacteria to one c.c., he observed a gradual and proportionate decrease in puerperal febrility. In 819 cases, injected prophylactically only with 25 to 50 millions of bacteria, the percentage of febrility was 16 per cent in the last series of 126, with a dose of 500 millions of bacteria, it had been reduced to 7.1 per cent. Also the cases of streptococic death seemed to decline in a similar ratio. Of the 819 cases of the first group four died, of all the remaining cases, treated with a dose above 50 millions of bacteria, only one died of a streptococcus sepsis. Joetten does not wish to exaggerate the meaning of these observations, but feels that they at least leave hope that successful protection against streptococcal puerperal sepsis might be obtained by an improved method. Garcia<sup>14</sup> claims good results from a routine injection of 20 to 40 c.c. of antistreptococcus serum in every woman entering the maternity in labor.

#### THERAPY

The question of the value of such surgical procedures as hysterectomy, ligation or resection of veins, etc., is still under discussion, but a marked trend toward conservatism can easily be noticed.

From countries far apart, from France, Australia and South America, come expressions of more or less enthusiastic approval of operative interference. Cadenat<sup>15</sup> feels sure that many more women, suffering from puerperal sepsis, could be saved by a vaginal hysterectomy, newly devised by him. It can be performed in from three to fifteen minutes, avoids contamination of the peritoneum and insures a wide channel for drainage. He considers this operation indicated in every case, in which no appreciable improvement within 24 hours is seen after thorough curettage of the uterus—and it may be emphasized here, that this is the only paper, which the reviewer has seen in recent literature, in which a writer mentions the curette without condemning its use in the puerperal septic uterus. An article of Nyulasy<sup>16</sup> does not specifically mention the extent of the author's personal experience with excision or ligation of the infected pelvic veins, but he is convinced that early operation may save many cases which are lost when treated on the lines hitherto followed. "Early operation to me has become a supreme duty." Turenne<sup>17</sup> thinks that, contrary to generally expressed opinion, puerperal, septic, utero-pelvic thrombophlebitis has signs, symptoms, and a clinical evolution which permits a diagnosis in the majority of cases. Although in more than half of these cases there



is a tendency toward subsidence and recovery, the high mortality of the remaining justifies modern operative methods of treatment. Surgical intervention, especially ligation of the thrombosed veins, is rational. Ligation of all the efferent venous trunks of the genital zone is desirable. Operations on veins are contraindicated by a permanent bacteremia, accessible thrombosis and in cases of visceral pyemic localization.

It proves much easier to quote papers, based on thorough anatomic investigations or on careful analysis of a very large clinical material, which discourage surgical treatment in general or condemn certain operations.

Sampson<sup>18</sup> shows by x-ray studies, that foreign material can be easily forced from the uterine cavity into the uterine veins, if the endometrium is injured or has been removed by curettage. He draws the most plausible conclusion that uterine contractions following relaxation when the cervical canal is obstructed, and intrauterine douches supply sufficient pressure to effect this escape of material from the interior of the uterus into its veins. This surely explains one way by which a general puerperal infection may result from intrauterine manipulations. Halban and Koehler,<sup>19</sup> in a comprehensive monograph published in book form, consider a very extensive material studied at autopsies. Analyzing the anatomic findings from the viewpoint of excision or ligation of pelvic veins, the surgical treatment of peritonitis, and hysterectomy, they feel that these findings clearly speak against the possible usefulness of all such procedures. Therefore, it cannot be surprising that surgical therapy of puerperal sepsis has rather generally proved a failure in practice. They are inclined to believe that in some of the operated cases seen on the postmortem table the operation possibly had removed the chances of spontaneous recovery. Conditions seem slightly more favorable for surgical intervention in peritonitis. Halban and Koehler thus arrive at the final conclusion that hope for better results does not lie in surgery but in an improved specific antibacterial treatment, or possibly in the discovery of a specific chemic bactericide of the type developed by Ehrlich.

A critical survey of the various methods of treating pelvic infections by Polak<sup>20</sup> begins with the statement that puerperal infections are directly proportionate to the number of vaginal examinations, therefore, abdominal and rectal examinations are preferable. Curative treatment is based on the proper recognition of the natural pathology. Realizing that the interior of the uterus is the principal portal of entry for bacterial infections, the fruitlessness and fallacy of all intrauterine manipulations, of curettage or irrigation, must be obvious. Drainage is more effectively obtained in the Fowler position, supplemented by having the patient lie on her abdomen. Ergot, pituitrin and ice-bag stimulate contraction and retraction of the uterus. After bacteria once have begun to pass from the uterus into the myometrium, or into lymph and blood-vessels, intrauterine manipulations can do only harm. In parametrial infections he considers absolute conservatism the best treatment. In beginning peritoneal invasion he follows an expectant therapy. Only if there is evidence of extension, the posterior culdesac may be opened. General hygienic and dietetic measures will help the patient in the fight against the bacteremia. Vaccines and sera have not proved of advantage. In cases of general peritonitis, incision, drainage, etc., have given no better results than the expectant plan.

The entire therapy of puerperal fever is still more exhaustively discussed by Schaefer.<sup>21</sup> Every form of local treatment, either for puerperal ulcer or septic endometritis has been definitely discarded. They never do any good, but are likely to do harm. The antiseptic vaginal douche is useless, but at least less dangerous than the intrauterine douche which may be directly responsible for an acute pyosalpinx or a general peritonitis. Any attempt to remove the septic endometrium with curette or spoon is extremely objectionable. There

are at present only two indications for local treatment left: (1) In cases of obvious retention of lochial secretions, in which the rise of temperature coincides with the sudden stoppage of all lochial flow, a glass tube may be carefully introduced into the uterus; (2) larger pieces of necrotic placenta may be removed, but only with the finger, smaller fragments are better let alone.

Extirpation of the infected uterus, as a rule, proves futile, with the sole exception of a postpartum necrosis of a fibroid. Surgical interference in cases of puerperal infection in the Berlin Frauenklinik at present is limited to: (A) Opening of pelvic cellular abscesses. If the tube contains pus, conservatism, rest and opium are preferable for immediate treatment. (B) In cases of peritonitis two flank incisions, without subsequent lavage, are made, preferably under local anesthesia, as soon as the diagnosis is positively established by the aspiration of pus through a hypodermic needle. (C) In cases of thrombophlebitis, ligation gives satisfactory results only in chronic cases, in which the process has persisted for several weeks, has remained limited to the veins, and has not caused phlegmonous processes in the uterus or surrounding tissues. In all acute cases the thrombosis is very likely to progress beyond the ligation, and the operation then may become responsible for a parametrial abscess, if not a peritonitis.

But most important, continues Schaefer after having finished the consideration of surgical therapy, is the general treatment which should be instituted promptly in every febrile case, in an endeavor to localize the process and to help the organism to develop protective powers against the bacterial invasions. For the purpose of obtaining early localization the use of heat at present has completely replaced the ice-bag formerly employed. For the purpose of general protection it is important to rid the circulating blood, as promptly as possible, of the germs already entered, and to prevent further entrance. A clear picture of the situation can be obtained only by careful study of the blood, repeated at least every other day, always including a blood culture. Antistreptococcus serum has failed with few exceptions, also the various colloidal silver preparations. Trials with the administration of methylene blue by mouth proved futile. Then Bumm suggested the combined use of antistreptococcus serum and methylene blue. This new treatment has yielded satisfactory results when applied in the following manner: 50 to 60 c.c. of antistreptococcus serum are injected subcutaneously into the thigh, followed in one or two hours by the subcutaneous injection of 0.05 grams of methylene blue in 20 c.c. of physiologic salt solution. Under steady control of the blood these injections are repeated daily for several days. Experience gained in the past two and a half years, in the opinion of the writer, encourages a continuation of this medication.

Reference has been made to the hope expressed by Halban, that a useful general chemie bactericide for puerperal sepsis might be developed. With this problem deals a paper of Miller and Chalfont.<sup>22</sup> Many different solutions have been used intravenously in the treatment of puerperal bacteremia. But, as the writers find from a study of the literature, apparently not one has stood the test and none has been adopted for general use. Bleyne tried salvarsan, and suggested 30 centigrams as a safe dose, but Hussy warned against its employment on account of its toxicity. Miller and Chalfont recommend arsenobenzol in a dose of 6 milligrams given immediately without the delay of a blood culture when the case offers the clinical symptoms of a blood stream infection. A decided drop in the leucocytes without a corresponding drop in temperature and pulse rate within the next twenty-four hours was considered an indication for repeating the injection. Eleven patients in all so far have been treated in this manner. Five received only one injection, three had two, one had three, and the two remaining, four injections. In every case they succeeded in ridding the blood stream of the invading germs.



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## Selected Abstracts

### The Bacteriology and Chemistry of the Vagina

**DeLee: Trichomonas Vaginalis Vaginitis.** Illinois Medical Journal, 1920, xxxvii, 186.

DeLee calls attention to this type of obstinate vaginitis, which is not rare. It usually proves most refractory to the customary types of treatment, because it is not properly diagnosed. Its clinical symptoms are persistent, and the profuse vaginal discharge, causing much annoyance to the patients on account of burning and pruritus, by way of sleeplessness leads to a neurasthenic "run down" feeling. The discharge is acrid, of a disagreeable odor, very irritating, and often causes the formation of pointed condylomata. The peculiar, granular appearance of the vaginal mucosa, "rough like a nutmeg grater," usually with small hemorrhagic points, almost enables one to make the diagnosis, which, however, must be confirmed by a microscopic examination of fresh vaginal discharge for the characteristic *Trichomonas vaginalis*. The writer found the following treatment most effective: On the first day, vagina and vulva are most carefully scrubbed, vigorously, with tincture of green soap and water by means of a rough cloth. The soap is rinsed out with distilled water. The process is repeated three times, followed by a 1:1500 mercuric chlorid douche and finished with another douche of distilled water. The patient is kept in bed. Next morning, the vagina is again scrubbed with green soap and sterile water, and then packed with cotton soaked in glycerin (4 ounces) and sodium bicarbonate (1 ounce). The next morning, cotton is removed and sterile water douche is given. As a rule, on the next following day the microscope will prove the disappearance of the trichomonas.

**Schroeder and Loeser: Trichomonas Colpitis.** Monatschrift für Geburtshilfe und Gynaekologie, 1919, xlix, 23.

Hoehne (in 1916), as the first, emphasized that *Trichomonas vaginalis*, generally considered a harmless parasite, is found in strikingly large numbers practically in all the severer and more obstinate types of vaginitis. He concluded that there might exist an etiologic relation. Later Kuestner, Traugott, and Wille confirmed Hoehne's observations, and also accepted his explanation. Wille stated that trichomonas can be detected in about 40 per cent of all free vaginal discharges. In a total of 2183 cases examined, Schroeder and Loeser, however, found only in 120 instances trichomonas. Investigating thoroughly the entire bacterial flora in these cases, and comparing their results with those of many previous investigators, they can only confirm the common assumption that most of the bacteria vegetating in the normal vagina originate



from the intestinal tract. The same holds true for the trichomonas, which by predilection seems to remain in the Lieberkuehn's glands of the intestine. They discovered that in these cases of colpitis, containing trichomonas in large numbers, the *Micrococcus gazogenes alcalescens* is rarely missing. This accounts for the foamy character of the secretion, mentioned by various writers as characteristic for the trichomonas vaginitis.

Analyzing carefully the bacteriology of the vagina under normal and pathologic conditions Schroeder and Loeser arrived at the final conclusion that the presence of an abnormal flora provides certain conditions which are particularly favorable for the propagation of the trichomonas. Not one of the many varieties of the trichomonas, so far known, has ever been found to possess pathogenic characteristics, therefore, it does not seem logical to assume that the *Trichomonas vaginalis* should be able to produce by itself a specific colpitis. The term trichomonas vaginitis is misleading and should be discarded. Of all the numerous methods of treatment for this disease, of which some have been designated as specific, the one will give temporary or permanent relief, which in the individual case is able to restore the vaginal flora approximately to normal. The trichomonas then is deprived of suitable conditions to thrive and disappears, coincident with the improvement of the vaginitis.

**Noguchi and Kaliski: The Spirochetal Flora of the Normal Female Genitalia.**

Journal of Experimental Medicine, 1918, xxviii, 559.

Except for the occurrence of the well-known *Spirochaeta refrigens* (Schauinn and Hoffmann) in both male and female genitalia, practically nothing is known about the spiral organisms in the normal female genitalia. On anatomic and physiologic grounds the female genitals undoubtedly afford more favorable conditions than the male for the existence of these saprophytic spirochetes. The examinations of the smegma, films and washings of the genital mucous membranes of normal adult females actually demonstrated that the number of spirochetes in the female is much greater. The varieties are identical in both sexes: *Treponema calligyrum*, *Treponema minutum*, and *Spirochaeta refrigens*, the first mentioned usually predominating.

Examination of the spirochetal flora of female children up to the age of two years showed conditions very similar to the adult.

**Goodmann: The Effect of Weak Acetic Acid on Spirocheta Pallida.** Journal American Medical Association, 1920, lxxiv, 803.

Experiments lead the writer to the conclusion that the *Spirocheta pallida* apparently is unable to live in an acid environment even as low as a 0.5 per cent solution of acetic acid. He suggests that an acid solution may prove of use in the prophylaxis of syphilis. He points in this connection to the fact that syphilitic chancre of the vagina are admittedly less frequent than chancres of the neighboring parts. The secretion of the vagina in adults is acid while that of the adjoining parts of the genital canal is alkaline in reaction. Certainly the vagina is equally subject to trauma and the deposition of the spirochete as the cervix, and the labia, the most common seat of the primary chancre. In the few reports of vaginal chancres which give the exact location of the primary lesion, it is most often found in the posterior fornix, i.e., where alkaline secretions coming from the cervical canal will neutralize the acid vaginal secretions.

**Graefenberg: Cyclic Changes in the Acidity of Vaginal Secretions.** Archiv für Gynäkologie, 1918, cviii, 628.

It has been known for some time that the vaginal secretions show acid reaction in approximately 60 per cent of the nonpregnant, but in between 90 and 100 per cent of pregnant women. This difference in itself suggested

strongly the dependence of this acidity upon certain physiologic changes in the genital tract. Graefenberg assumed that these conditions could be understood better by determining, by means of titration, the quantitative average of the acid contents of the secretions. Finding the acidity variations far too great for the safe calculation of an average, even in apparently healthy women, he considered it more promising to divide them into groups which would comprise definite clinical conditions such as healthy nulliparæ, healthy multiparæ, patients with leucorrhœa, pregnant women, etc. Again he discovered the same fluctuations within the same group. Then he began to determine the acidity of the vaginal discharge of the same woman at different times by repeated titrations. Once more he could observe striking changes, the index of acidity often multiplying many times within a few days. He started to plot these changes of the same individual in a graphic chart, and obtained curves revealing a certain regularity. When he recorded on the same chart also menstruation, he was finally enabled to establish the surprising, but very evident, fact that in all women the acidity and menstruation curves run parallel, the acidity curve reaching its peak just before menstruation and beginning its decline immediately after menstruation, the lowest level falling into the menstrual interval. Continuing these investigations on patients, in whom the uterus, but not both ovaries had been removed, on patients suffering from leucorrhœa, and also on pregnant women, he came to the definite conclusion that this rhythmic change in the acidity of the vaginal secretions is not dependent upon any function of the uterus, or the admixture of menstrual blood, but must be directly caused by that part of ovarian function to which today is generally ascribed the wave-like, rhythmic change of many other conditions (blood pressure, pulse rate, temperature, metabolism, etc.) during the reproductive age of woman. How closely the acidity variations are associated with the evidences of sexual maturity Graefenberg was able to demonstrate by the acidity curve of women entering the menopause, when the wave peak becomes lower and lower, and the curve actually changes into an almost straight line, gradually declining until it reaches zero. If at the beginning of menopause menstrual flows become irregular, the acidity curve still maintains its regularity, showing strikingly that acidity is independent from uterine activity and entirely determined by ovarian function.

The acidity of vaginal discharges cannot any longer be explained as due to the Doederlein bacillus, a fact which indeed has been doubted by previous investigators. This change in acidity presumably is significant in the reproductive process, the lowest acidity, i.e., a condition more favorable for the spermatozooids, prevailing at a time when according to recent investigations conditions in general have been found most favorable for fruitful cohabitation. The variations in vaginal acidity are but a part of those cyclic changes which express normal ovarian activity, and, therefore, it cannot be surprising that acid values are found relatively low and less fluctuating, much like in the menopause, also in those cases of primary sterility in which certain clinical and anatomic findings suggest ovarian hypofunction as the underlying cause.

**Engelhorn: Biology of the Vagina.** *Monatsschrift für Geburtshilfe und Gynaekologie*, 1919, 1, 282.

Titration of the vaginal secretions of pregnant women shows a higher acidity than in the nonpregnant. This may be explained as due to certain histologic changes (edema, dilatation of vessels, hypertrophy of papillæ, etc.) In the same manner histologic changes probably also account for the evident reduction in acidity during the menopause. In the presence of an alkaline

reaction in the vagina the introduction of sugar will bring a prompt change to an acid reaction.

**Stellwagen and Pelouzi: Are Diphtheroids a Factor in Female Sterility?**

Journal American Medical Association, 1918, lxx, 977.

This question was suggested to the writers by the observation of an anterior urethritis in a man, apparently caused by the Hoffmann type of the pseudodiphtheria bacillus. The same bacillus also was discovered in the cervical canal of the patient's wife, sterile in spite of intravaginal medication, dilatation and curettage, after seven years of married life. Three months after a vaccine treatment had been finished, she became pregnant. In two other cases of female sterility they found in the one a pure culture of diphtheroids, in the other a mixed growth in which the diphtheroids predominated. The writers do not answer the question asked in the title in the affirmative, but feel that these findings should encourage further study.



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## Original Communications

### AN ANALYSIS OF THE FAILURES IN RADIUM TREATMENT OF CERVICAL CANCER.\*

BY FREDERICK J. TAUSSIG, M.D., F.A.C.S., ST. LOUIS, MO.

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THE wonderful palliative results and considerable number of cures following the radium treatment of cervical cancer have been satisfactorily established in the reports of various clinics in the last five years. In the future our efforts should be directed not to the narration of occasional successes, but to the analysis of our still far too frequent failures with this method of treatment. Only by such a critical review of the technic and results of various methods of treatment can we hope to find measures that will bring our permanent results to a point in advance of those obtained by surgery.

My own experience dates back to November, 1917, when, following a stay of two weeks at the Memorial Hospital in New York, studying the technic and results of radium treatment at that institution, I began treatment of our cases at the Barnard Free Skin and Cancer Hospital (services of Dr. George Gellhorn and myself). From that time to March 1 of this year, I have treated 86 cases† of cervical cancer and 6 cases of vulvar cancer, partly in combination with surgical measures. While it is of no special interest to give percentages on the basis of an experience of but two and one-half years, the immediate results can be seen in the accompanying table:

These immediate results are far from inspiring, but this must, in part, be attributed to the fact that we sought in the first year and a half to include every case sent to our institution no matter how wretched the patient's condition.

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\*Read at the Forty-Fifth Annual Meeting of the American Gynecological Society, Chicago, May 24-26, 1920.

†Of this number, 21 cases were treated in private practice, and 5 were assigned to me at Barnes Hospital, through the courtesy of Dr. Henry Schwarz.

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

## RESULTS OF RADIUM AND OPERATIVE TREATMENT OF 86 CASES OF CERVICAL AND VAGINAL CANCER

November 1917-March 1920

TOTAL	EARLY OPERABLE 3		ADVANCED OPERABLE 6		BORDER- LINE 13		INOPER- ABLE 52		ADVANCED INOPERABLE 12		TOTAL 86	
	Rad. Oper.		Rad. Oper.		Rad. Oper.		Rad. Oper.		Rad. Oper.		Rad. Oper.	
Number of cases	1	2	0	6	6	7	52	0	12	0	71	15
Free of recurrence	1	2	0	2	3	2	7	0	0	0	11	6
Recurrent	0	0	0	1	0	2	11	0	0	0	11	3
Dead	0	0	0	2	3	3	29	0	11	0	43	5
Not traced	0	0	0	1	0	0	5	0	1	0	6	1

All operative cases were given radium treatment either before or after hysterectomy or at both times.

When one sees an occasional desperate case show marked improvement, it is a great temptation to extend the indication of radium treatment to the utmost limits. We have, however, come to the same conclusion as Bailey, that the chance for doing harm is so much greater than for doing good that these women had better be given acetone treatment and opiates. Radium only leads to increased suffering.

There is still some argument as to whether roentgenologist or gynecologist is better qualified to give radium in this special field. Personally, I believe that the difficulties of bimanual examination in these cases require the services of a trained gynecologist for correct interpretation of results. The roentgenologist, even with occasional examinations by a specialist, cannot properly keep track of results of treatment or be able to judge the suitable dosage. Neither does it follow that every gynecologist can or should become expert in this special field of work. We should make a distinction between the treatment of benign and malignant conditions. Every gynecologist should qualify himself to use radium in the treatment of fibroids and the myopathic uterus. The necessary experience can be acquired quickly. Far different is it with the treatment of cancer. Here we have a problem whose complexity puzzles even those of us who have been working with radium for years. Offhand, I should say that the technic of the radical Wertheim operation for cervical cancer was simplicity itself, compared to the technic of radium treatment in this disease. To properly qualify for this work, one should not only undertake preliminary studies by visiting for several weeks the large radium clinics in this country but have access to a considerable cancer material for continued study and treatment. Much also is to be gained by keeping in touch with the manner of treatment and results of radium treatment in cancer of other organs.

No matter how careful the preliminary training, however, mistakes are unavoidable. We must all learn in the school of experience. Perhaps the first and most general mistake is the attempt to extend too widely the limits of radium treatment. When one sees a perfectly hopeless case suddenly take a new lease on life, change from a bed-ridden morphine addict with large foul-smelling cervical crater to an apparently healthy woman, able to do her work

for a period lasting over two and one-half years, it is no wonder enthusiasm overleaps its bounds. Such was the case in one of our patients whose record is worthy of special note.

Annie S., aged fifty-five, entered the Barnard Free Skin and Cancer Hospital on May 2, 1917, with an inoperable carcinoma of the cervix. Six months previously she had been at the City Hospital where the condition was considered inoperable and an excochleation was done December 8, 1916. Since this operation there had been continuous foul-smelling discharge and severe pains in the lower abdomen. Physical examination showed the posterior lip of the cervix gone with induration posteriorly to the rectovaginal septum. Both parametria infiltrated to the pelvic wall. Rectally a hard mass projected into the lumen of the rectum with mucosa still intact. She was excochleated and cauterized on May 4, 1917, May 29, 1917, July 2, 1917, August 3, 1917, and Sept. 6, 1917. This repeated cauterization treatment, in accordance with Lomer's suggestion, was associated with acetone treatment administered three times a week. Aside from a diminished discharge, there was no improvement. From September to November she was receiving daily  $11\frac{1}{2}$  grains of morphine hypodermically. In November we began to receive radium emanations through the generosity of the Memorial Hospital of New York for a short period of time, and on November 21st an application of 157 mc. filtered in  $\frac{1}{2}$  mm. German silver was made within the crater. On December 17 another application of 217 mc. for nine hours was made with the same filtration in the same location. This totalled 3444 millicurie hours. There was marked retrogression within six weeks. On January 7, 1918, the pain was so much lessened that only an occasional dose of morphine had to be given. Considerable scar tissue was present in the pelvis, so that it was not until April of 1918 that it seemed certain that complete retrogression had occurred. The patient has reported for examination at intervals of three to six months since, in perfect health and without any visible evidence of cancer. She gained 25 pounds in weight. The last examination was made February 24, 1920.

Such a case is but the exception that proves the rule, as our experience in twelve other far advanced cases has lately demonstrated. In all of these women there was profound cachexia and involvement to the pelvic wall; in one case a rectovaginal fistula was already present. Every one of these women died within seven months of the time of their treatment, in two instances within four weeks. Occasional slight temporary improvement was noted, but in most of them pain was rendered worse and fistulae developed sooner.

*Dosage.*—The question of dosage has been discussed in a somewhat slipshod manner by many writers, who state merely the total mgrhs., without any detail as to filter, duration, and interval of treatment, method of application, etc. I think the complete reports given by Janeway in all his publications have been distinctly worth while. Only by stating all essential points can we expect to evolve an improved technic of treatment. The very small doses using 50 mgrs. of radium for periods of 24 hours and the very large doses running up to 10,000 mgrhs. intravaginally, have been generally abandoned. Doses are given ranging downward from Kehrer 6,000; Heyman 5,500; Bailey 5,000; Schmitz 4,500; to Schauta-Adler 3,500; Bumm 3,000; Seitz-Wintz 3,000; Menge 2,500; Janeway 2,500-3,000; Burnam 2,000 to 8,000 depending on the extent of the lesion. This dosage refers to the first treatment, no matter whether scattered over several applications in the course of the month or given all at one time.



In many instances some additional radiation will later on be required. But more and more the general feeling is that the first treatment is the crux of the matter; we either "make or break," depending upon our success at that time. There is not as much difference as one would think between the smaller doses of Janeway of 2,500 and those of Heyman of 5,500, for Heyman gave his treatment with a heavy filtration of 3 mm. lead in addition to 0.3 mm. silver, whereas Janeway imbedded bare emanation needles of low power up to 20-23 mc. in value into the tumor mass itself. Although in ordinary calculation the dosage of Heyman would be twice that of Janeway, it is probable that the total radium rays absorbed by the tissues was greater in Janeway's form of treatment, including as it did the hard beta rays as well as all the gamma rays, than in Heyman's, which permitted only a portion of the gamma rays to escape. This question of filtration is one of vital importance and one concerning which there is still considerable difference of opinion. If we wish to get superficial wound healing with but little primary local irritation, there is no doubt in my mind that the very heavy filtration is to be preferred. But our problem is more complex than that. We want to produce deep destruction of cancer with least irritation of the normal tissue. The best filter for this purpose is the growth itself. Heavy filters are too bulky and are not needed for this work, since the cauterizing effect of the hard beta rays is here rather to be desired than otherwise. The use of heavily filtered rays intracervically has therefore only disadvantages. We must differentiate, however, between applications made within a cancerous crater, whose walls partly involve the remnants of the posterior vaginal fornix, and a real intracervical treatment. In the former case a heavy unfiltered dose may lead to profound rectal irritation and even a fistula, for the vaginal wall is sensitive to such beta rays. My own feeling in the matter is that heavy gamma radiation on the first treatment may not show any bad results at the time, may in fact be followed by marked retrogression, but that it has a greater tendency to produce fibrosis and obliterative endarteritis, so that when a second or third treatment is given, the normal tissues are more liable to that profound necrosis which we all have learned to dread as the most serious complication of radium treatment.

As to the interval of treatment, I am more and more inclined to make this a matter of months than of weeks. Since without exception it practically takes at least six weeks for the tissues to show the full result of a heavy radium treatment, all applications within the first four weeks should be considered as one treatment. Thus Heyman, of Stockholm, whose results are in many ways very good, made three applications, the second one a week after the first, and the third at the end of four weeks, the total dosage being about 5,500 mgrhs. He calls this three treatments, but since the therapeutic effect was cumulative over a single period of eight weeks, it should be more properly considered as one treatment. Thus far it would seem that the best results are obtained by attempting to effect a cure in the first treatment period. Occasionally one or two additional treatments are necessary, but where this is the case, the prognosis is much worse. In fact, my own experience corresponds with that of Heyman and Janeway who found that when, after apparently complete retrogression the cancer again showed renewed growth, it could only

in the rarest instances be checked, no matter what treatment was given. In a large number of patients such added treatment actually did harm.

The question as to the point of application and manner of application also needs careful consideration. Intracervical applications are essential for success in the first treatment. I cannot agree with those who wish to melt away a cauliflower growth with radium, for this implies an intravaginal treatment, and the vagina is far more sensitive to radium than the cervix. The mass should be scooped away in the usual manner with a spoon curette, at least sufficiently to leave a small crater or pocket in the cervix in which the radium can be deposited. Occasionally in flat hard growths the radium, divided into several capsules or emanation-tubes, can be placed close against the growth by means of a dental compound applicator or paraffin coated lead mold. In all cases, however, either a needle or a small,  $\frac{1}{2}$  mm. silver capsule should be placed high up in the cervical canal so that it lies in part above the apparent extent of the growth and shoots its rays from above downward. As to the use of the Bailey bomb method, I think its preeminent value consists in its attack on the parametrium. I see only disadvantage in its effect upon the cervix itself, for the closer the applicator in this case, the better the effect, and the bomb cannot get as close as other forms of applicators. I take it that a well-directed cervical or cervicovaginal treatment of 2,500 mgrhs. will in most instances annihilate the cancerous deposits in that first group of lymph nodes lying close to the ureter, but further out in the parametrium we need a more penetrating dose. For this purpose the bomb with its heavy dosage for a short period of time, its distance of 1 to  $1\frac{1}{2}$  cm. from the vaginal wall and its sheltering filter from all sides except the point aimed at is the ideal applicator. I only wish we might possess sufficient emanation to utilize it. In the meantime a massive x-ray dose can serve as a fairly good substitute in all except the very fat women. Rectal applications to effect the parametrium have been unsatisfactory in my hands. In eight cases in which I have employed them the irritation produced has been intense, no matter how heavy the filter, with very slight effect on the tumor itself. In the diffuse filtrations of the vesico-vaginal septum, distance applications, well filtered as suggested by Burnam have given good results. In vaginal cancers of the flat infiltrating type the use of Janeway's dental compound mold is a great help in accuracy and closeness of application. It is of great importance, as Kelly and Burnam state, to have the patient assume the knee-chest position for the radium application, at least where there is no absolute fixation of the uterus. In this position the cervix falls away from the rectum and by a properly placed gauze pack, in addition to a lead or gold filter, the very painful rectal tenesmus following radium treatment can be reduced to a minimum.

To summarize my technic I advise in cervical cancer of the inoperable stage an intracervical application of 125 mgrs., 25-50 mgrs. of which in the form of a steel needle or  $\frac{1}{2}$  mm. silver capsule is placed high up the cervical canal and the remaining 75-100 in silver capsules packed against the cervical ulcer in accordance with its size and shape. The vagina and rectum are protected by a paraffin covered lead shield 2-3 mm. thick, and gauze used to immobilize the application. The application should last for 20-22 hours, a total

of 2,500-2,750 mgrhs. Two weeks later a massive x-ray dose over 6-8 "portals" should be given. The second treatment should be given only in case the retrogression is not complete after 8 weeks have elapsed. Then a small dose of 1,800-2,000 mgrhs. filtered with silver and 1 mm. of brass should usually be given as high as possible in the vaginal fornix. The cervix is usually obliterated at this time.

Where emanations in large quantity are accessible, the most logical method would seem to be the use of 20 mc. bare emanation tubes buried in the cervix, a total dosage of 2,640 mgrhs. when fully absorbed in about three to four weeks. At the same time a well filtered application of 1,000 millicuries in the Bailey bomb is made for one hour to each parametrium and either x-ray or radium abdominally and sacrally. The use of emanation in this way may give somewhat better results, but the many cures reported by Clark, Ransohoff, Bumm, Flatau and others sufficiently disprove Bailey's statement that the possessor of 100-200 mgrs. of radium had better content himself with mere palliative measures in the treatment of cancer.

Among the serious sequelæ of radium treatment, septic infection demands first consideration. Curtis recently reported a case of this kind, and we have probably all seen varying degrees of pelvic peritonitis following radium treatment. Such infections would seem to be rather the result of the radium reaction upon a previously infected uterus or tube, than an infection due to the introduction of the radium itself. We also see frequent infections of the urinary tract. In fact, the so-called "radium fever" coming on between the third and seventh day after application is usually due to this cause. Where the fever persists, I have often found a pyelitis the responsible factor. In one such case all pelvic pains and fever were promptly relieved after catheterization of the ureters with instillation of silver solution.

Severe hemorrhage occurred in eight cases as a result of radium necrosis affecting a branch of the uterine artery. In all of these cases a gauze pack was required to control the bleeding. The bleeding was much more profuse than in the untreated cancer cases, but since such blood loss occurred only once or twice at long intervals, the resulting anemia was not as severe as in the untreated cancers with continued dribbling of blood for months.

Most annoying of all radium complications are the fistulas, more especially the rectovaginal ones. Clark at last year's meeting of the American Gynecological Society, stated that in his experience radium treatment actually decreased the frequency of vesicovaginal and rectovaginal fistulas in unrestricted carcinoma of the cervix. I think a closer analysis would have shown that, while radium probably to a degree decreased the frequency of vesicovaginal fistulas, it at the same time increased the number of rectovaginal ones. The reason for this probably lies in the greater proximity of the cervix to the bladder and its markedly favorable reaction to radium treatment as compared with the vagina. Before we began radium treatment at the Skin and Cancer Hospital we saw in the far advanced cases about five vesical fistulas to one rectal fistula. After radium treatment was begun, the proportion was almost reversed. In our group of 86 cases, nine developed rectovaginal fistulas, and in two there was in addition a vesicovaginal fistula.



I am excluding from this number three cases in which a urinary fistula followed as a result of a hysterectomy. In analyzing the rectovaginal cases I found that only in one instance did the fistula follow a lightly filtered treatment; twice the fistula appeared in cases that had received both light and heavy filtered treatments, and in the remaining six instances the fistulas appeared in cases where the treatments were all heavily filtered. In two of these nine cases only one or two radium applications were made and in both of these the fistula did not appear until four months or more after the last application and just previous to the death of the patient. These fistulas were therefore probably primarily due to the disease itself. In the remaining seven cases, from three to five treatments heavy filtered at intervals of two to four months were given. It is this repeated gamma radiation, even in moderate dosage, that leads so often to this complication. Another harmful factor that Weibel has justly emphasized is the combination of previous hysterectomy and radium. Weibel found marked rectal tenesmus and occasional fistulas following prophylactic vaginal radiation after hysterectomy, and hence advised against it. One of the rectovaginal fistulas developed after a second radium application following hysterectomy. Doubtless the diminished blood supply of the vagina after hysterectomy renders it more liable to radium necrosis.

In some of the cases with marked rectal tenesmus and stricture formation, the fistula comes rather as a relief than otherwise. Both Burnam and Bailey have noted this point and found temporary improvement following the breaking through of the rectovaginal wall. With this in view and having had similar experiences, I recently did a colostomy on a patient whose rectum was almost occluded by fibrous infiltration. Considerable improvement was noted following this procedure and I think it is worthy of further trial in these troublesome cases.

#### VAGINAL AND VULVAR CANCER

Six primary vaginal cancers and six vulvar cancers were treated with radium. Only one of the vaginal cases is free from recurrence; three are dead; one recurred, and one was not traced. In the vaginal cancers, however, the result of operation in even the very earliest cases is so bad that radium is rightly to be preferred. Carcinoma of the vulva, on the other hand, is most unsuited for radium treatment. The radium reaction on account of the free nerve supply in this region produces severe and prolonged burning and pain. The local retrogressions are slow and incomplete and the glandular metastases which occur so uniformly in this form of cancer seem to appear earlier and grow more rapidly where radium has been used. Only one of our six cases is at present alive and in that case excision of the vulva and tributary glands was combined with the use of radium. Unquestionably surgical measures will give better result, although an occasional cure, as in Janeway's case, may be found, where radium alone is used.

Primary cancer of the body of the uterus, if operable, we have always treated by hysterectomy in preference to radium. In one of our inoperable radium cases it seemed possible that the tumor sprang from the uterine body, though the cervix was also involved. No improvement was noted in this patient.

## OPERATIVE CASES

Operation in the form of a more or less radical hysterectomy was associated with radium treatment in fifteen cases of our series. In seven of them a typical Wertheim operation was done, followed by a prophylactic radium treatment. Three of these seven had a recurrence in the following year that required additional radium treatment. In three other cases the cancer was found to be too extensive to permit of a complete Wertheim operation. The remaining five were borderline cases rendered operable by rapid retrogression following radium treatment. There was no operative mortality in this series of fifteen cases. Of special interest are the findings in the five uteri that were removed after partial or apparently complete retrogression following radiation. In four of them about 1-3 cubic cms. of cancerous tumor tissue was still present within the cervix. These cases had received a dosage of 2,200; 2,400; 2,200; and 3,200 mgrhs. respectively from 1 to 4 months before hysterectomy. In the fifth case a dose of 2,520 mgrhs. was given intracervically. Although in this case the cancer was completely eradicated from the uterus, an enlarged iliac lymph-node removed at operation showed malignant involvement.

My experience with early operable cancer of the cervix treated only with radium is limited to one case that remains clinically cured for a period of 22 months. The contraindication to operation in this case was a high blood-pressure, nephritis and obesity. The arguments of Janeway, Ransdoff and Flatau in favor of radium in all of these early cases do not appeal to me. The two first named talk of an operative mortality of 20 to 25 per cent following the Wertheim operation, but leave out of count entirely that this is not the mortality where the operation is limited to early cases. Kelly did not lose a case in 20 such early cancers removed by operation. In my own series there was no mortality. At the most, a mortality of 5 per cent could be held against radical operation in the early operative group. The proportion of complications and fistulas would also be greatly reduced under these limitations. Bumm's statistics are most impressive. He reported in January, 1919, that out of 77 operable cases of cancer of the cervix treated in 1913 and 1914 with radium, 17 remained cured for five years, whereas out of 203 similar cases operated between 1911 to 1913, 77 remained cured in 1919 making a proportion of 22 per cent cured with radium, and 37 per cent cured by operation. While both these percentages are higher than those obtained in other clinics, they tend to show that under similar conditions operation is still attended with a greater likelihood of permanent relief in the early cases. Until an improved technic of radium treatment has changed this proportion of favorable results, I think we should be very cautious in recommending the use of radium in early operable cancer of the cervix.

I am, however, inclined to share Bailey's views against operative removal of the uterus where radium has produced sufficient retrogression to make such a procedure possible. Out of my five cases, two are already dead, one has cancer in the glands, and two are for the present free from recurrence. Even in the absence of any operative mortality, not enough is gained to justify such a procedure. With Kelly I now believe we should limit our operative work to the evidently favorable group of early cases.

## SUMMARY

1. Radium treatment of uterine cancer should be kept in the hands of the gynecologist rather than the roentgenologist, but such a gynecologist should seek preliminary training in the use of radium and must have continued opportunity for observation and treatment of cancer cases in order to reduce mistakes to a minimum.

2. Good permanent results can be obtained in a certain proportion of cervical cancers with amounts of radium not exceeding 100-150 mgrs. of the element, though the use of large amounts in the form of emanation will doubtless decrease complications and increase the number of cures to some degree.

3. If possible, all necessary treatment should be given within the first six to eight week period before sclerosis has set in and rendered the cancer less accessible and the normal tissues more susceptible to injury.

4. Tumor filtration or light metal filtration together with intracervical application does most good and least damage; 2,500-3,500 mgrhs. are usually enough to give results in the favorable cases.

5. In the absence of the Bailey bomb and large amounts of emanation, well directed and prolonged x-ray from 6-8 portals will usually affect the parametrial and glandular involvements.

6. Prolonged necrosis and fistulas are due to repeated treatments, to vaginal applications and to heavy gamma radiation or to a combination of the three.

7. Rectovaginal fistulas are more frequent and vesicovaginal fistulas less frequent after radium treatment.

8. Operation is to be preferred in *all* operable cases under 35 years and in the early operable cases beyond this age. Radium is to be recommended wherever obesity, lung, heart, or kidney lesion, makes operation difficult or dangerous, and in advanced operable, borderline and inoperable, but not in the advanced inoperable group with cachexia.

These are, of course, not conclusions, but merely estimates based upon an analysis of the results thus far obtained. Under improved methods of treatment and wider experience they will doubtless be materially changed.



## OPERATION OR RADIUM FOR OPERABLE CASES OF CERVICAL CANCER?<sup>\*</sup>

BY WILLIAM P. GRAVES, M.D., F.A.C.S., BOSTON, MASS.

THE question of whether to operate for operable cancer of the cervix is at the present moment offering to the science of gynecology a new and enlivening problem. Fortunately it is one that requires for its solution only sufficient time in which to secure an adequate comparison of final results between operated cases and those which under similar conditions have received radium treatment. At the present time such a comparison is necessarily incomplete. In most clinics, as in our own, for example, the radium treatment has been applied only to inoperable and borderline cases, and it is but recently that a certain few experienced surgeons have discarded operative measures entirely and are treating with radium cases that are frankly operable. The final solution of the problem must therefore await conclusive evidence from the work of these pioneers. We must also take into account the fact that radium in sufficient quantities to afford successful treatment for cancer of the cervix is possessed in only a few localities, and that even in the best equipped radium institutions the questions of dosage and technical methods of application are still very much in the experimental stage. During the period required for a more general distribution of radium and the development of technical knowledge in its use, it is incumbent on those who are seeing many cases of cancer of the cervix to view the problem of treatment from an unprejudiced standpoint, and to contribute from their own experience whatever facts may be of general value.

The present paper is a personal accounting of stock, by one who with an average amount of operative experience and possessed of a moderate quantity of radium, has had an opportunity of comparing, to some extent, the results of both methods of treatment.

In order to make as complete a review as possible, I have combined the analysis of my own cases of cancer of the cervix with those of my associate, Dr. F. A. Pemberton, whose percentages in results, so far as they may be compared, have been almost identical with my own. Many of the details of the analysis I shall defer for another paper and shall here mention only those figures which are of especial interest for the subject in hand. The list of cases comprises those seen and treated by Dr. Pemberton and myself, at the Free Hospital and in our respective private practices. The period of observation extends from the present time back to the date of my first radical operation for cervical cancer eleven years ago.

Our first inquiry in the analysis of these figures must be directed toward the question of the actual value of radical operative methods. Especially is this necessary in view of the rather scathing criticism to which the surgical

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<sup>\*</sup>Read at the Forty-Fifth Annual Meeting of the American Gynecological Society, Chicago, May 24-26, 1920.

operation of cervical cancer is at the present time being subjected by certain of the more progressive of the radium enthusiasts. Thus we are told that the radical operation is too difficult for practical use by the great body of surgeons and should be attempted by only a few skilled specialists. The disadvantages of the Wertheim operation are described in the following quotation from a widely read author.

"In these days of low mortality percentages attending nearly all major operation, no operation can possibly gain headway which combines with it a shockingly high mortality and large majority of distressing and desperate sequelæ. The effect on the lay mind must be taken into consideration, for while one may have over 50 per cent of ultimate cures among those patients that survive the operation, the effect on the average intelligent citizen is abhorrent, if for this number of survivors there have been twenty-five deaths, and for the other twenty-five a wretched existence attended by repulsive postoperative sequellæ, followed by a painful and lingering death."

In other words the operation is being condemned for its low percentage of operability and curability, its high immediate mortality and the large percentage of its postoperative sequellæ. To us these criticisms seem overdrawn and we have made this first statistical review of our cases with a particular interest in establishing the truth regarding these points.

Of first importance in any statistical report on the subject is the question of operability. The variation in operability percentages given by different surgeons is very great. In general the figures in this country are lower than those from abroad especially in Germany. Thus, Clark found only about 20 per cent of his cases operable. Taussig gives 25 per cent. Jacobson in a review of the work of 18 surgeons estimates a combined operability of 46.2 per cent; Wilson in England gives 32 per cent; Wertheim gives 50 per cent. Other higher figures are Berkeley, 63 per cent; Aulhorn, 65 per cent; Favre, 70.8 per cent; and Busse in Krönig's Clinic, 78.9 per cent. It is to be regretted that some of the most prominent of American surgeons have omitted operability figures in their statistical reports. In our work we have seen 181 cases, of which number 114 have been subjected to radical operation by the abdominal route. Subtracting three cases which refused operation, our operability percentage amounts to 64, a comparatively high figure.

The question of operability, undoubtedly depends to a certain extent on the state of public education in a given community both with regard to the laity and the profession and it is quite possible that this factor accounts to some extent for the higher rate of operable cases seen in the clinics of Germany, where a systematic propaganda of public instruction in malignant disease has been carried on for many years. On the other hand, in this country a very wide divergence in operability often appears in different clinics of the same community. We may therefore conclude that the estimate of operability depends to some extent on the individual judgment of the attending surgeon.

There is no doubt that the nature of the institution is an important factor in operability percentages. Thus in a large cancer institute a greater percentage of hopeless cases would probably be seen than in a smaller surgical hospital like the Free Hospital for Women.

In our choice of cases for radical treatment we have always been influenced by a firmly grounded conviction of the value of operation both as a curative and as a remedial measure, and it has been our policy to give to our cancer patients every possible chance either for a cure of the disease, or for a reasonably comfortable prolongation of life. We have therefore made it a practice to operate on every case in which there is a fighting chance to remove the disease without killing the patient or causing permanent injury to the hollow organs of the pelvis.

The next important point in the consideration of the surgical treatment of cervical cancer is the matter of operative mortality. In our series of 114 cases there have been six deaths resulting from the operation, or 5.2 per cent primary mortality. In view of the relatively high percentage of operability, this mortality figure is satisfactorily low. As has been the case with other operators, most of the deaths were the result of unfamiliarity with the technic of the operation. Dr. Pemberton lost his first case, but has had no other deaths in his list of nineteen operations. The other five deaths belong to the writer in his series of 95 operations. With the exception of one case of pulmonary embolism in 1919, these deaths occurred during the period of surgical inexperience.

Our low mortality record we do not ascribe to any special operative skill, but rather to the exercise of a certain amount of common sense in the performance of the operations. In the great majority of our cases (99), the Wertheim technic has been employed, but after a few unhappy experiences we came to realize that in certain unfavorable cases the attempt to secure a wide dissection of the parametrial and paravaginal tissue is attended with too great danger of uncontrollable hemorrhage or permanent injury to the ureters or bladder to make it feasible. Under such conditions in several cases (15 in all) a short cut has been taken across the parametrium close to the cervix and vagina in the manner of a complete hysterectomy. The occasion for this more conservative method of extirpation has occurred when a dense unyielding parametrium has been encountered, the result of a long standing parametritis, or of a too drastic preoperative treatment with radium. In some cases it was employed in very fat patients, with inaccessible uteri fixed deep in the pelvis. Occasionally the Wertheim technic was carried out on one side of the pelvis and the short cut taken on the other. Special effort has been made to avoid sepsis and hemorrhage, the chief causes of immediate mortality. In the majority of our cases the cancerous mass has been curetted and cauterized a week or ten days before operation, during which time the vagina is treated with formalin applications. The reduction of the cervical mass greatly facilitates the dissection of the parametria, while the antiseptic treatment of the vagina, reduces to a minimum the chances of infecting the peritoneal cavity during the vaginal amputation. For the control of hemorrhage we have not found it necessary to tie the internal iliac arteries, but have pursued the "tie as you go" principle. This method keeps the operative field clear of obstructing clamps and enables the operator at all times to be master of the situation. As a consequence, postoperative shock has been an infrequent occurrence.



It has been our studied policy to avoid leaving the patient in a condition of worse suffering than she would have had without the operation. Thus in no case has there been an injury of the ureters, and in only one case has there resulted a vesical fistula from injury to the bladder. One patient had a rectovaginal fistula, resulting from a gauze pack in the pelvis, inserted to control a difficult hemorrhage. Aside from these two cases, the only fistulae that we have had in our series have resulted from the overzealous prophylactic applications of radium following operation. In fact we are able to state with considerable emphasis that in our experience the "wretched existence attended by repulsive postoperative sequellæ" described by Dr. Ransohoff, is much more likely to result from radium treatment than from a radical operation performed with rational conservatism.

Of course the supreme test that shall decide the choice of treatment must rest finally upon the question of permanent cure. It is customary to compute the end results of the radical operation for cervical cancer on the basis of the so-called five-year curability test. Although we all know that a patient living and well and without palpable recurrence at the end of five years is not always permanently cured, nevertheless for the sake of comparison we must adopt this arbitrary time limit as our standard measure. In estimating the five-year curability in our operative cases we find that it amounts to a figure ranging between 27.6 per cent and 34.2 per cent according to the particular formula used in computation. This relative curability percentage compares sufficiently well with the figures of Jacobson who gives a combined result of 23.4 per cent for 18 American surgeons. It, however, is disappointingly small when contrasted with the figures of Wertheim with 42.5 per cent, Peterson with 47.3 per cent, and recently Cobb with 57.1 per cent. It is interesting to note that there are in this series six patients alive and well who have not quite completed the five-year period of curability. If this paper were to be written a few months later the proportion of relative curability would be distinctly improved. The following is an abstract of the full statistical report of our cases compiled by Dr. J. C. Janney.

Total cases seen .....	181
Refused operation .....	3
Cases operated on—Dr. Graves.....	95
Dr. Pemberton.....	19
Total cases operated on .....	114
Operability .....	64%
Operative deaths .....	6
Operative mortality .....	5.2%
Relative curability—5 years.....	27.6%—34.2%
Absolute curability .....	16.8%—18.5%
(According to formula of computation.)	
Type of Operation	
Wertheim .....	99
Complete hysterectomy.....	15

We must now direct attention to our results with the use of radium and inquire whether there has been in these results any justification for giving up the radical operation for operable cases.

Our earlier observations of the radium treatment were made in conjunction with the Huntington Hospital, at that time under the clinical direction of Dr. Thomas Orday and were later carried on at the Free Hospital for Women after the acquisition of 100 milligrams of radium salts in the usual divided amounts. In addition to the treatment of inoperable cases, an endeavor was made to employ radium as an adjuvant to radical surgery in operable cases. A number of borderline cases received intensive radiation, and were then subjected to radical operation. Three of these consecutively operated on a few days after the last radium application, developed an acute postoperative pelvic peritonitis from which one patient died. As these were the only instances of peritonitis in the series, and as all the conditions were similar in the three cases, it seems probable that the radium devitalized the normal tissues in some way so as to leave them nonresistant to infection. After this experience the operation was postponed for at least three or four weeks after the last radium treatment, as recommended by Wertheim. No more serious sepsis was encountered. In all of the cases, however, which had received several radium treatments, the parametrium was sclerotic and devoid of the usual plains of cleavage. It was in cases of this kind, wherein it was found impossible or at least inadvisable to carry out the Wertheim technic of isolation of the ureters and wide dissection of the parametria. More recent experience has shown us that a single moderate dosage of radium does not sclerose the parametrial tissue and thus prevent the extended operation. In frankly operable cases, however, we are not convinced of the value of a preoperative treatment of radium.

A second method of using radium as an aid to the radical operation, is its application as a prophylactic after operation. A number of cases were thus treated in the earlier experimental days of radium and an uncomfortably large percentage of them developed fistulæ after a lapse of several weeks or months. Here again there is no doubt that the radium was injudiciously applied and that with a proper technic, most of these fistulæ might have been avoided. On the other hand it must be granted that the short vaginal pouch left after a radical operation with its thin atrophic wall, offers a feeble resistance to radiation and is susceptible to burns even when the radium is most skillfully applied.

We have therefore given up the prophylactic use of radium after radical operation in which a satisfactory extirpation of the disease has been attained. In other words in a case favorable for operation we no longer use radium either before or after the operation.

On the other hand when the specimen removed at operation shows that the extirpation has been incomplete, radium is applied as soon as the vaginal wound is healed. Three cases treated in this manner about a year ago have not yet shown palpable recurrence.<sup>1</sup>

In the treatment of postoperative local recurrence we have found radium invaluable, though here again in some of our earlier cases we had trouble with fistulæ. In several instances the disease disappeared for astonishingly

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<sup>1</sup>Note: Since the paper was read, one of these patients developed a recurrence.

long periods of time and in one case we think we have effected a cure. This patient was operated on in 1909, for well-advanced cancer of the cervix. She remained well for five years when she had a local recurrence in the vagina, as proved by microscopic examination. Under radiation at the Huntington Hospital the recurrence promptly disappeared, and the patient is now, six years after the radium treatment, and eleven years after the radical operation, perfectly well.

In our treatment of inoperable cancer of the cervix we have had many brilliant temporary results and many disappointments. We have at present in our series a number of so-called "clinically cured" patients, but our previous experience does not warrant us in regarding any of these cases as permanently cured with the one exception mentioned above. It must be granted, however, that as our operability standard is exceptionally high, the cases assigned for radium treatment are necessarily of a rather hopeless type and that we have not given radium an entirely fair trial.

In the general review of our work it will be seen that we do not feel the same degree of discouragement with regard to operative treatment as is expressed by some surgeons in recent literature. On the other hand radium in our hands, though it has been invaluable as a palliative, has proved disappointing as a curative agent and we have not yet felt justified in substituting it for operation in a favorable case.

This conclusion, it must be repeated, is formed entirely from personal experience and does not accord fully with the views of others. Our next inquiry must therefore be whether our comparative failure in the use of radium is not due to inadequate methods of application rather than to any fault of the agent itself.

The question has been readily answered. I was fortunate enough to be present at the important radium conference held at the Memorial Hospital of New York in March of this year, and had the opportunity of seeing and examining many of Dr. Bailey's cervical cancer cases. It was entirely obvious to me that Dr. Bailey's results are far better than our own, both as regards palliation and permanent curability. This superiority in results must be ascribed to a greater knowledge and experience in the use of radium, to the possession of large quantities of radium element, and to the elaborate and efficient technic of application. The conclusion from our personal results should therefore not be generalized.

Granting that cervical cancer is curable by radium, and that when properly applied in frankly operable cases, radium may be surer and safer than radical operation, a possibility that is by no means remote, are we then to give up the operation in favor of radium? The question must be answered according to the surgeon's individual facilities. In our own case with a fair operative experience, but inadequately equipped with radium and its necessary appurtenances, we are undoubtedly doing our best for our patients by continuing to operate on operable cases.



## THE EQUIPMENT, THE ORGANIZATION, AND THE SCOPE OF TEACHING IN THE OBSTETRIC DEPARTMENT OF A MODERN MEDICAL SCHOOL\*

BY BARTON COOKE HIRST, M.D., F.A.C.S., PHILADELPHIA, PA.

IT is a noteworthy fact that the revolutionary changes in the teaching and practice of obstetrics in the United States during the past twenty years has received little attention from this Society. In the forty-four volumes of its transactions, among the many papers presented at the annual meetings, I remember but one that dealt with the improved training of young physicians who will be our successors. Has not the Society thus lost an opportunity for leadership which would have added to its prestige and influence?

The trustees of medical schools, advisory committees, state legislatures and boards, naturally turning to the leading national society for advice and information, must have been astounded at its aridity in this field. The writer's endeavor in this communication is to make a tardy amend for the neglect of a question which, it would seem, might have excited interest and received careful consideration long ago.

There are medical schools still undergoing reorganization under private control. Legislatures must give this matter thought in organizing the increasing number of schools supported by the state, the expense of technical education often making private management impracticable. It is in the hope of furnishing information for the governing bodies of such institutions and to give aid and support to the teachers who are ambitious to have their departments as nearly as possible on an ideal basis, that the following propositions are advanced. In a medical school designed for about 400 students in a four years' course, the equipment of an obstetric department which entitles it to a respectable position must consist: (1) Of a hospital of at least 100 beds, with a clinical amphitheatre, a separate operating room for septic cases, and an isolated space for infected women. The apportionment of beds should exceed that for surgery or medicine for the average instructive capacity of each case in obstetrics is limited in the majority of instances to one or two students. (2) An ambulatory dispensary for the preliminary study of patients and for the follow-up observation and treatment of all cases after discharge from the hospital. Such a dispensary accumulates in time a large service, illustrating the pathologic sequelæ of parturition, including practically all the diseases of women. It should be equipped with every appliance, including electrical, for treating women, and should have a social service department attached. (3) An out-patient department, with the necessary personnel of nurses, physicians, and social service workers. This department should have a separate ambulatory dispensary. On a basis of about 2000 women cared for in their homes annually

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an enormous attendance can be secured of women awaiting delivery and, by a follow-up system, of women suffering from any of the complications or sequelæ of the process of generation at any stage. This service is a valuable feeder to the central hospital, to which all cases requiring operative or other hospital treatment are referred.

It is evident that such an organization gives the obstetric department an amount of clinical material in all the conditions peculiar to women that no other department can rival or even approach. What is more important, every therapeutic measure required by women can be shown to the student; the preventive treatment of gynecologic affections by the proper management of labor; the relationship of diseases of the pelvic organs to the productive function; the effect of operative measures on subsequent childbearing and *vice versa*. In short to any intelligent student the necessity is made obvious of a closely correlated study of all the pathologic and physiologic phenomena of the female generative organs; the effect of the former on fecundity and reproduction and the causative relationship of parturition to the vast majority of woman's diseases.

Such is the broad view of modern education, contrasting strikingly with the provincial American practice of the past; an obstetric department concerned only with the delivery of women without regard to their future and a misnamed gynecologic department dealing only with a moiety of the subject, busily engaged for the most part in patching up the results of other physicians' bad obstetrics. Such an arrangement was evidently doomed to extinction by modern progress and could no more be revived than we could recall to life the elder Mr. Weller. The medical pedagogues of America must agree with their confreres in the rest of the world that the scope of obstetric teaching embraces, not only the physiology and pathology of reproduction, but necessarily all the diseases of women. The chief of an obstetric department must be a thoroughly trained abdominal and pelvic surgeon, maintaining proficiency in his art by constant practice. Otherwise he is not fit for his position and would be incompetent to deal with the cases that may be admitted to his clinic at any moment; ruptured uterus with injury of intestines requiring resection, diaphragmatic hernia in pregnancy, discovery of disease of the gall bladder in the course of an abdominal operation and so on through a long list. In brief, he must be prepared to deal surgically or otherwise with all the ills of women whether complicating pregnancy, labor, and the puerperium, or often their direct consequence.

We have in the University of Pennsylvania a voluntary and a compulsory student's internship in the Maternity. The amount of material he sees, the notes he takes, and his conduct on the service are collated to establish his rating in the final examination. I find this record of a student's clinical opportunities during a voluntary internship of two weeks: Seven normal deliveries; one extraperitoneal Cesarean section; one transverse presentation with version; Cesarean section for placenta previa, compound presentation with two feet, hand, occiput and prolapsed cord; Cesarean section for a monster, dicephalus tetrabrachius; ten plastic operations; two ovarian cysts; one hydrosalpinx; one salpingitis; one exploratory laparotomy; one supravaginal hysterectomy;

one large ovarian cyst; one cancer of the sigmoid—resection; six curettages; three appendectomies; one gas anesthesia; one radium application; two intravenous injections of salt solution; one blood transfusion; two inevitable abortions; one uterine irrigation; one ruptured ectopic gestation. This same individual had another compulsory week's internship in the hospital, a two weeks' voluntary service in the out-patient department, and another compulsory 10-day period, a year of theoretical lectures; another year of clinics, conferences, section work and ward classes in which he saw, heard described, and personally assisted in the treatment of a large additional number of cases such as have been detailed.

The following question naturally suggests itself. If the chief of an obstetric department must be an accomplished pelvic and abdominal surgeon, if his department properly organized and conducted controls an amount of clinical material that no other can rival, if he alone in the medical faculty can teach *all* the conditions which the physician must treat in women, is it pedagogically or economically justifiable to maintain in a medical school a so-called gynecologic department which can only duplicate the teaching of the surgical and obstetric departments and in a manner necessarily inferior to both? This question has already been answered in the only way it could be answered, by the majority of our best medical schools. It is being similarly answered today as opportunity occurs by vacancies in existing chairs, and it will presently be answered conclusively and finally. As an interested observer, an occasional participant in the transactions, and an old member of this Society, it appears to me impolitic to allow a movement which vitally concerns us all to gain irresistible headway and to reach its ultimate goal, apparently ignored by the very organization that should foster and direct it. The reason for our past attitude is obvious. Some of the members occupying positions which are now anomalous and anachronistic would perhaps feel hurt by this discussion. Others, disinterested, might, in the spirit of a *laudator temporis acti*, be honestly convinced that the old order should not be disturbed. But the issue is too important to be influenced by self interest or unprogressive minds. This is the only country in the world now rich enough adequately to equip its medical schools; consequently the hegemony of the medical education of the world lies within our grasp, if, having the money, we have the wit to seize it. Apparently the world's center of wealth, power, and civilization, shifting with the ages from Mesopotamia, Egypt, Greece, Rome, and Northern Europe, is moving to this continent. It is an inspiring thought that each one of us puny mortals in his tiny sphere may play a part in such a stupendous cosmic drama. Let us teachers of one of the most important medical branches put our house in order, that we may merit a place among those who assist and do not hinder the passage to America of the world's leadership in medical education.



## GYNECOLOGIC PROBLEMS IN INDUSTRIAL MEDICINE\*

BY HARRY E. MOCK, M.D., F.A.C.S., CHICAGO, ILL.

THE noted gynecologist, Howard Kelly, in 1908 pointed out the inhuman and intolerable conditions under which most working girls were forced to labor. He stated "their conditions are so bad as to be absolutely defenseless from social and economic reasons irrespective of health, and reform will come, though perhaps slowly, that will make it impossible to exploit the work of a girl who has not reached the age of puberty." He classified ill effects upon the health of all working women as due to their external conditions:

1. "Long confinement indoors in superheated, badly ventilated, dirty rooms.

2. "Work permitting little change of posture and enforcing either long continued sitting or standing.

3. "Contact with unhealthy work companions suffering from tuberculosis or other infectious diseases."

These conditions existed not only for the factory girl, but for the clerks in stores and the teachers in schools. Kelly said: "The remedy for these conditions will never be effective until all places of employment for women are under rigid inspection of a competent health department with power to enforce sanitary conditions."

"Reform of these intolerable conditions" was a prophecy in 1908 that has been largely fulfilled during the last decade and to the glory of the medical profession can much of the praise for this accomplishment be attributed. Medico-sociologic problems are being considered more and more by great scientific gatherings, demonstrating that the profession is awake to its broad duty of conserving the nation's man-power, as well as to the problems of disease in the individual.

The last ten years have witnessed the birth in our profession of a new specialty known as industrial medicine and surgery. From the old time company surgeon, content with the bandaging of cuts and the anointing of bruises, there has evolved a new type of physician in industry concerned with the whole problem of human maintenance. Before entering upon a discussion of the gynecologic problems which present themselves to a department dealing with human maintenance, it is desirable to give a brief outline of what is included in industrial medicine and surgery as applied to the individual industry.

In an industry employing hundreds or thousands of people, a veritable human laboratory is furnished the physician where he can study correlated problems of medicine, sociology, and economics. He soon develops the habit of interpreting his findings in terms of the economic end-result—instead of awaiting the development of disease or injuries in order to apply his curative methods. He

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forms habits of studying the prevention of diseases and accidents. In time a competent health department is developed in the industry which includes the following activities:

#### I. THE PREVENTION OF DISEASE AND ACCIDENTS

(a) By a study of the nature of the work and the discovery of possibilities for occupational diseases and methods of preventing the same.

(b) By safety methods, educational campaigns and a "follow-up" of every injury cause in order to prevent new accidents or recurrences of accidents.

(c) By industrial sanitation: improving the working home, removal of dust, gases, etc.; ventilation, illumination, proper eating places, sewerage and garbage disposal, cleaning, care of toilets and cuspidors and numerous other sanitary measures.

(d) By a study of the physical conditions of the employees themselves and their relation to occupation to discover possibilities for breakdowns due to misfits; or due to fatigue poisoning; or potential causes for accidents within their bodies; or possibilities of spreading diseases to fellow employees.

#### II. THE SUPERVISION OF THE HEALTH OF EMPLOYEES

(a) By physical examination of all applicants for work in order to place employees on jobs according to this formula: Physical qualifications plus occupational qualifications equal the job; and again to eliminate those applicants who cannot be employed "with safety to themselves, to others or to property."

(b) By physical examination of old employees at stated intervals or wherever indicated—one of the best means of coming into personal contact with each worker.

(c) By health talks to individuals and to groups; and by personal advice bearing on each particular case.

(d) By developing proper habits of exercise, bathing, diet, etc., among the employees.

#### III. ADEQUATE MEDICAL AND SURGICAL CARE

(a) By supervising the type of medical care received from outside physicians.

(b) By furnishing proper medical care in certain types of cases.

(c) By furnishing the best surgical service to all injured employees.

#### IV. NURSING SERVICE

(a) By furnishing trained nurses to assist the plant physician and often to render certain forms of first aid.

(b) By nurses visiting all sick employees: to see if proper care is being received, to assist by certain nursing duties, and otherwise show the friendly interest of the employer in the sick employee.

Ten years ago only a few of the larger corporations had installed medical services. The number gradually increased until in 1916 it was possible to organize the American Association of Industrial Physicians and Surgeons composed of 150 members, physicians who were pioneering in this field of conserving and reclaiming the man-power in the industrial army.

Then came the war and with it the very rapid development of this new specialty. It is wrong, however, to speak of it as a new specialty, for industrial medicine is only the application of old principles of prevention and curative therapy to large groups of people. But the cry for more and more production in the essential industries caused many of them to install medical departments in order to maintain their working forces. The adoption of many of the principles of industrial medicine by the army and their further development, with the opportunity of observing their worth when applied to hundreds of thousands of men, resulted in establishing industrial medicine and surgery upon a firm foundation.

Today at least 400 industrial concerns have adopted a more comprehensive medical service than that of a company doctor, whose sole duty is the care of injury cases. At present the American Association of Industrial Physicians and Surgeons has 600 members representing this broader type of physician giving part or all of his time to industrial practice. We have classified 2000 physicians who are doing chiefly industrial work. There are at least 5000 more physicians employed by the accident insurance companies to care for injured workmen. Some of these are doing excellent work, but the majority represent the cheap contract practice which begets cheap service and very poor results.

When you consider that over 30,000,000 of our people are engaged in gainful occupations and that only between six and eight millions of this enormous army are receiving any kind of organized, adequate, preventive and medical service, you gain some conception of the magnitude of the work still confronting the medical profession. It is the patriotic duty of our profession to train well qualified physicians for this industrial practice and to educate employers and insurance companies to use only these qualified physicians in the protection of the lives and limbs of the working forces, for in this way alone can we best contribute to the maintenance of the man-power of the nation.

It is estimated that at least 10,000,000 girls and women are included in this industrial army of 30,000,000 people. Thus it is apparent at once that the diseases and injuries peculiar to women furnish a large proportion of the problems connected with maintaining the human element in industry as an efficient force.

In past years I have received a great many inquiries concerning the type of occupations women should enter. During the war an effort was made to have the Federal Government make a survey in order to classify positions available for women and to arbitrarily decide which of these occupations they could enter and from which they must be barred.

General principles on this subject might be laid down, but the real selection of proper occupations for women can only be made by considering each individual case in relation to her chosen work. In order to do this, every woman worker should receive a careful physical examination and the occupation then chosen according to her physical qualifications. In every case the question of whether she is physically and mentally fit to do the work and whether the occupation will be unduly hazardous for her must be answered.

#### MEDICAL EXAMINATION OF WOMEN EMPLOYEES

The practicability of examining female employees has been demonstrated in a number of large industries throughout the country. Some of these have employed women physicians and subjected every girl employee to a complete examination from head to foot, while the majority of concerns have given only a partial examination including the head and neck and chest. Careful history taking and questioning usually reveal abdominal or pelvic symptoms which indicate a more thorough examination. Consent of the parent or of some relative should then be obtained before making the pelvic examination and then



it should always be made in the presence of a nurse, and in the case of virgins under nitrous oxide anesthesia. One large industry which for three years completely examined every girl employee found that the number of pathologic conditions discovered by this system were only slightly in excess of those found by the partial examinations in other concerns. They have since discarded the method as it was very distasteful to their girl employees.

The conditions usually found in healthy males by examining below the waist are hernia, venereal disease, hydrocele, varicocele and undescended testicle, varicosities, deformities of the extremities, flat-feet and other foot conditions. Remember most employees examined are apparently healthy and the examination is not made for the purpose of discovering some acute disease. The proportion of these conditions found by examining women below the waist are small compared with men. Hernia is rare in women—even the femoral type which is the commonest form found in this sex.

Dr. Schereschewsky states that he found one hernia in five hundred examinations of female garment workers. In two thousand examinations of girl employees, where the history of the case indicated a more thorough examination, the author found three femoral and one inguinal hernias. In five hundred consecutive examinations in a gynecologic dispensary the author found only five femoral or inguinal hernias whereas umbilical and ventral hernias were common. These were chiefly found in older women who had borne children. Therefore the need of examining female employees for hernia is not sufficient to warrant subjecting them to the naked examination. Questioning as to whether they have a lump or swelling in the groin will usually be answered in the affirmative by a woman employee if a hernia does exist.

Venereal disease is often hard to detect in women. I have been told by the physician in charge of the work in the concern referred to above that the percentage of venereal cases found by their complete examinations were very few. In our clinic we have discovered cases of syphilis among the girl employees, but this was done by the detection of mucous patches in the throat or the rash on the body.

Varicose veins are common among older women or among the married women who apply for work. These do not object to the physician examining their extremities. But the average girl employee has been protected from the type of occupations which have made varicosities more prevalent among the male workers.

Because of the rarity of conditions found below the waist line, influencing woman's fitness for work, most physicians in industry have therefore limited their examinations to the head, neck, and chest.

#### REST ROOMS

No greater efficiency measure can be installed by an industry than a properly located, adequately equipped rest room, especially where girls and women are employed. In visiting numerous concerns I have found rest rooms provided for the girls, which were located in some dark, out of the way corner or were part of the equipment of the toilet rooms. They were

uninviting and very few girls would use them. Wherever women are employed, clean, airy rest rooms removed from excessive noises should be provided. They should be furnished with single beds, instead of hard cots, with clean pillows and sheets and warm blankets. A nurse or some qualified matron should always be in charge. Screens should separate the beds so as to furnish privacy to each girl. The room should be kept cool and well ventilated. Its very appearance should be restful. It has been my experience that girls with temporary illness are always glad to go to such a rest room, remove only their shoes or perhaps loosen their skirts and corsets and crawl in between the clean sheets and under the warm blankets. The nurse can then bring them a hot water bottle—often a hot drink. After an hour or so these girls usually feel well enough to return to work. Without proper rest rooms these sick girls usually go home, losing the greater portion of the day and often longer because the exertion of going home has made the condition worse.

#### DRINKING AND TOILET FACILITIES

When employees are engaged on piece work and especially in the case of girls, one often finds that insufficient water is consumed and the requirements of nature are neglected. The girls refuse to lose the money by taking time off for these things.

The only solution for this is that the employer will give ample time, without loss to the employee, to attend to these essentials. Bubbling fountains should be located near the working places and every employee should be thoroughly educated as to the importance of water drinking. No better remedy is at hand for the prevention of fatigue than frequent flushings of the body organs by water.

For every five hundred girl employees there should be provided close at hand at least five toilets. The toilet rooms should be kept clean and well ventilated. Washing facilities should be in the room or an adjoining room. Receptacles for refuse are necessary. Means for obtaining sanitary napkins should always be present in these rooms.

#### CLOTHING

In departments where men and girls work together great difficulties in ventilation are presented during the winter months because of the flimsy waists worn by girls. They are easily chilled when a window is opened, and demand more heat than is wholesome in the departments.

Older gynecologists have complained of the tight corset and of the heavy skirts worn by women, and hanging from the waist, as the most frequent causes for enteroptosis and pelvic abnormalities among women. Today tight corsets and heavy clothing are not so prevalent, neither are they as important a causative factor of these conditions as the faulty posture assumed by so many women and girls in standing and walking.

Shoes still play an important rôle in reducing the efficiency of working girls and undoubtedly contribute largely to many pelvic disorders. It is obvious that the high Cuban or French heel with the thin turned sole or the low pumps were never made to work in, especially if the work requires stand-

ing. If working women can be persuaded to wear shoes modeled after those recommended for soldiers, they will develop strong feet and will be able to qualify for many more positions than have been opened to them in industry in the past.

High-heeled shoes, loose skirts, flowing sleeves and other peculiarities of dress are hazardous in occupations about machinery. During the war one state factory inspector informed me that in a large industry where women employees had largely replaced the men there was a 50 per cent increase in the number of fractures among the employees as compared with the year before. He claimed that in 75 per cent of these cases of fracture, the high-heeled shoes worn by the women were responsible.

#### DISEASES COMMON TO WOMEN EMPLOYEES

From an analysis of fifteen thousand cases of absence from work on account of sickness I found that headaches caused 24 per cent of the absenteeism. Headaches are more common among girls than men and cause great loss to every concern employing girls. The condition is usually indicative of some other trouble, the correction of which will stop this drain on efficiency. Constipation is present in many cases, while diseased tonsils, defective teeth, and other foci of infection about the nose and throat, as well as defective vision, are frequently the source of headaches. Fatigue, poor diet, especially at the lunch hour, insufficient water drinking, late hours, and many other conditions, either in their work, in their living conditions, or in their bodies, are found as the cause of headaches when the physician takes the time to carefully analyze these cases.

Dysmenorrhea came second in the causes for absence, making 18 per cent of the absenteeism. When we consider the great number of girls who must rest for a few hours or slow up in their work for a day or two because of this condition of painful menstruation, we realize that this problem is one of great economic importance, causing an incalculable loss to all the concerns employing great numbers of girls.

The causes of this condition are many. A small percentage are due to anatomic displacements or some pathologic change in the generative organs. The majority of the cases, however, are traceable to other conditions more or less remote from the pelvis. Of these, constipation, and the conditions predisposing to this, such as improper food, lack of exercise, etc., is the commonest cause. For several years many state legislatures have endeavored to improve health conditions among working girls by enacting laws making it necessary for them to sit while at work. In my opinion constant sitting during the long working hours is as bad, if not worse, than constant standing. The sitting posture causes more or less congestion of the pelvic organs which is increased by constipation so often associated with constant sitting. If girls could be persuaded to dress properly and then could be gradually trained to standing and walking for several hours, much healthier employment could be found for them than the sedentary occupations to which they are now condemned, chiefly by legislation. Under the existing conditions, occupations which allow part time sitting and part time standing, or, if this is impossible, frequent rest



periods which will allow the girls to stand and move about, will be found of the greatest benefit in overcoming dysmenorrhea.

The next commonest cause for this condition is in an unstable, nervous mechanism. A large percentage of the girls who report to the doctor's office because of painful menstrual periods also report at other times because of various nervous manifestations, such as fainting, hysteria, "nervousness," and other neurasthenic symptoms. I have submitted hundreds of these girls to thorough physical examinations (not including vaginal) and many of these have shown signs of "neurocirculatory asthenia," the long narrow chest with the acute intercostal angle (Spiller type), movable or even floating kidneys, especially of the right side, exaggerated abdominal reflexes, and general enteroptosis. Many girls suffer from neurasthenic symptoms during their periods which are based upon the teaching or lack of teaching of the mother. They have been told to keep quiet, avoid excitement, never bathe and similar instructions, all of which stimulates fear of consequences and tends to develop the neurasthenic state at each subsequent period. It is imperative that our girls be taught that this is a normal condition and should not be regarded as a "sick time." Fear is one of the greatest breeders of dysmenorrhea.

I have submitted girls to vaginal and rectal examinations, usually under gas anesthesia, whose dysmenorrhea could not be accounted for by the above conditions or cured by the correction of the same. Only a small percentage of these cases showed definite pathologic changes which could account for the dysmenorrhea. Of these, an acute retroflexion of the uterus was the commonest finding, marked retroversion being the next commonest condition. These conditions should, I believe, be considered as possible causes only when associated with inflammatory changes. In many of these cases the rectum was found impacted with fecal matter even when constipation was not complained of. Care of the bowels and proper exercises, such as assuming the knee-chest position for several minutes, three times a day, relieved many of these, while in a few an operation was necessary. The operative cases gave uniformly good results chiefly because such radical treatment was not instituted until all other sources of the trouble had been eliminated except, perhaps, in some due to neurasthenia.

The number of girls suffering from dysmenorrhea in the working force can be greatly reduced by systematic efforts directed toward this end under the supervision of the medical staff. Here nurses and intelligent foreladies can be of greatest assistance, in fact they must often take the lead in directing the routine measures suggested by the doctor. The first essential is to decrease the number of cases of constipation to a minimum. Next, every industry employing girls should provide the means for healthful recreation including games which afford plenty of outdoor exercise. Instruction by lectures will be found of great value, but better than this is a careful study of each case of dysmenorrhea followed by individual instructions concerning the methods of overcoming it. The nurses can give these instructions by many intimate talks with the girls. Hot drinks, especially those of high caloric values, combined with a short

rest in the rest room, will enable many to return shortly to work, whereas medicine given to relieve pain only tends to create a habit.

Following the teachings of certain gynecologists concerning the cocainization of the little tubercles or "sex centers" in the nose, as a means of relieving dysmenorrhea, I had the opportunity of trying this out in several hundred cases. In those cases showing a marked neurasthenic tendency, remarkable relief was often obtained by this measure. Efforts to relieve them by other suggestive measures were not clearly successful. No relief was afforded in those cases where some pathologic pelvic condition was later discovered. There were a few cases of dysmenorrhea which could not be accounted for by the nervous state, by constipation, or by any pathologic pelvic conditions which yielded to this form of treatment. It was hard to explain the relief obtained by some of these cases on any other hypothesis than that of suggestion and yet there were some cases which seemed to be benefited when the element of suggestion was completely eliminated.

Constipation is one of the commonest complaints among girl employees and plays a very important rôle in the minor illnesses causing short periods of absenteeism. In over a thousand consecutive records of working girls, approximately 33 per cent gave a history of constipation, 20 per cent of whom were habitually constipated. The easiest course for the doctor to pursue in these cases is to give them a Seidlitz powder or a pill, but such a method only serves to increase the trouble. For years I met this problem by giving every employee who complained of constipation a printed diet sheet containing anticonstipation foods which could be readily purchased at the restaurant or carried in the lunch basket, as well as served at home. In addition, each case was given a prescription for a fruit mixture, similar to fig paste.

In one department employing twenty girls I found that 70 per cent of these suffered from constipation and approximately 50 per cent had dysmenorrhea. Efforts to overcome these two conditions were concentrated on this group. The forelady secured a table in a restaurant where they could all eat together and insisted on the manager of the restaurant serving the girls with at least two of the articles mentioned in the constipation diet list. She also saw that the girls made up the fruit mixture and used it. In addition, they were stimulated to take plenty of exercise outside of working hours. Within one month the constipation was completely overcome in every case, and within three months the ten girls who had been accustomed to report to the rest room for their sick time or to remain away from their work for a day, ceased this practice.

Stomach trouble, nausea and cramps and pain in the side not related to the menstrual period are symptoms frequently complained of by girls who have lost time from work, or who come to the rest room seeking relief. Girls arise in the morning, hurriedly dress, and because they "don't feel like it" or because they are late, rush off to work without eating. About the middle of the morning they become weak, sick at their stomach, and are forced to report to the doctor's office. Usually a little food, a glass of malted milk, or a hot chocolate furnishes quick relief, enabling them to return to work. On

the other hand, these stomach conditions, fainting and nervousness are the commonest manifestations of fatigue poisoning in girls. When a girl reports three or four times with these conditions, a careful investigation of her working conditions usually reveals the cause.

Backache is a frequent complaint among girl employees. The majority of these girls have been told by their family physicians, by their mothers, or by some well-meaning old lady that the backache is due to inflammation of the ovaries. It is surprising to find how many girls think their backaches are due to pelvic inflammation. A careful study of these cases shows the greater number of backaches are due to causes removed from the pelvis and the correction of these causes cures the backache. Judging from the percentage of cures, the commonest causes for backache are badly diseased teeth, infected tonsils, flat-feet, high-heeled and other types of faulty shoes.

From this short résumé of the diseases most prevalent among working girls it is evident that preventive gynecology can find a great field for study and development in these health departments of industry.

#### MEDICOLEGAL

The commonest gynecologic conditions complained of by women employees as the result of injuries sustained, are backache associated with pelvic disorders, displacements of the uterus, miscarriages in married working women and dislocated coccyx.

A careful study of the various causes for backache will usually clear up this claim, especially when a careful vaginal examination reveals some old pelvic inflammation. In my experience four different girls have gone to lady physicians for an examination following injuries followed by backache. In these four cases the woman physicians diagnosed dislocated coccyx. Careful x-ray examinations and the securing of a competent gynecologist or surgeon as an arbitrator resulted in the claims of these four cases being dropped. I have seen two other cases where coccygodinia followed severe falls and were undoubtedly caused by injury to the coccyx. In one of these cases there was considerable pain and swelling in the floor of the vagina.

Girl employees very frequently complain of displacements of the womb as a result of injury. In my experience the commonest causes for these claims are such accidents as falling down stairs, or being forcibly knocked down by some fellow employee running through the aisle, by a truck, or an automobile. Practically every one of these claims develops after the girl employee has consulted the family physician; or quite frequently after some woman physician has told her that a displaced womb has resulted from the accident. Often this statement is made by the family physician without a vaginal or rectal examination being made. These girls will complain of severe pain in the back and of painful menstrual periods, both of which "never existed prior to the injury." All such cases should be submitted to a thorough pelvic examination. This should always be done in the presence of the mother or a female relative and a nurse and preferably with the patient anesthetized with nitrous oxide. Where this has been done, I have never found a case which showed the uterus displaced except in two older women, both of whom showed



other evidence of a displacement of long standing, such as relaxed vaginal walls, and in one a definite cystocele and rectocele.

Personally, I am convinced that a permanent displacement of the uterus never follows direct violence. It is conceivable that such violence might cause a temporary displacement, but the organ would undoubtedly almost immediately resume its normal position. Pelvic symptoms may follow severe trauma in the region of the pelvis and in such cases temporary displacement may be present which must be treated by rest and other means, often resulting in temporary disability such as may follow any strain. The only compensation, therefore, which should be paid such cases is for this temporary disability. It is often cheaper in doubtful cases to repair the condition, paying compensation for the time lost from work, just as in the case of hernias, the traumatic origin of which is doubtful rather than allow the condition to persist with the subsequent claims for permanent compensation.

Recently I was called on an injury case where the woman employee—twenty-eight years old, stepped on an object on the floor while at work, causing her to fall. She was not severely injured and was able to finish her day's work and then go home on the street car. That night labor pains developed, associated with hemorrhage and a few days later she had a premature labor, with the birth of a five months' fetus. This married woman had been employed only two weeks by this concern—was not examined for employment and naturally blames the fall for the loss of her baby. In the absence of history of other miscarriages and with definite witnesses of this fall the court might readily assume this to be the most probable cause of the miscarriage. A fifty thousand dollar lawsuit is pending as a result of this accident. The employment of married women, therefore, introduces many other factors into the gynecologic problems in industry.

Intolerable and inhuman conditions for our working girls and women still exist in many places. Child labor with the employment of young girls even before the age of puberty still persists in many sections of the country especially in the South. Every one of you have witnessed the hundreds of prematurely old women who come to the dispensaries of our large cities with relaxed abdominal walls, cystoceles and rectoceles and prolapsus uteri. Many of these are mothers with several children to care for during the day and then are forced to seek a living as scrub women in our large office buildings at night. Overworked, underfed, and without sufficient sleep, these women are leading an intolerable existence in our midst. Hundreds of thousands of working girls are undermining their future usefulness as mothers, and even their ability to become mothers, by working in places where occupational diseases are prevalent because of lack of industrial sanitation. Thus while we can point with pride to the accomplishments of industrial medicine and surgery, still there is a great work confronting the medical profession and the gynecologist of the future will find that he has a very important rôle to play in these efforts to conserve the Nation's man power and woman power.

# THE DEVELOPMENT OF PRENATAL CARE AND MATERNAL WELFARE WORK IN PARIS UNDER THE CHILDREN'S BUREAU OF THE AMERICAN RED CROSS\*

BY FREDERICK L. ADAIR, M.A., M.D., MINNEAPOLIS, MINN.

**P**RE- OR ANTENATAL care is that part of a Public Health Program which has as an ultimate object the influencing of the health of the offspring beneficially by surrounding the mother with proper conditions during pregnancy. It is virtually inseparable from that part of a Maternal Welfare Program which has to do with safeguarding the health of the prospective mother during gestation. These are combined with another part of the Maternal and Infant Welfare plans which deals with the proper care of mothers and infants at birth and during the lying-in period. It seems logical to consider the so-called pre- or antenatal care which deals with the prospective mother and future offspring during the period of gestation as the natural connection between maternal and infant welfare work.

It might be well to summarize briefly what the author understands by a Maternal Welfare Program in relation to Public Health work, especially that dealing with the care of infants.

## FUNDAMENTALS OF A MATERNAL WELFARE PROGRAM

Any complete health and social welfare program should include two public welfare activities, viz: maternal and infant welfare, which are closely related and should be very carefully coordinated. These activities are intimately bound up with the family and concern particularly the mother and child. While these two sub-programs are more or less closely related to all the other public welfare work, they have more points of contact with each other than with the rest of such activities. From an administrative viewpoint these two activities could be comprised in a maternal and child welfare program, but from a medico-social standpoint the work should be handled by experts in the different lines of work.

The contact between these two phases of work may be termed "pre- or antenatal care." This implies care both of the prospective mother and child. It should be supervised by a doctor with helpers who are especially competent to direct and to deal with the problems of "prematernity." From the viewpoint of infant welfare workers, the results to be obtained from this care of mothers are: (1) the lowering of infant mortality especially the early mortality; (2) the lessening of morbidity to the lowest possible level; (3) the handing over of a healthy child as early in its life as practicable, with its mother able and fit to care for and nurse it, to a doctor who is competent to deal with the many problems of infant life. The elaboration of this program

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of infant and child welfare may be left to those who are more competent to pass on this phase of the work.

Prenatal work is a small part of the maternal welfare program, for the latter involves various activities. It comprises so many kinds of work and thought which are related to all sorts of welfare ideas and plans that it is undesirable if not impossible to carry out the complete program except as a part of a comprehensive general program.

The objects of the maternal welfare program are: (1) to develop healthy parents, especially mothers who are intelligently trained; (2) to bring them through life to maturity capable of having and rearing normal children; (3) to reduce the maternal, fetal and newborn mortality to the lowest possible level; (4) to leave the mother with a desire and capacity to bear and rear children properly in a sufficient number and of such a quality as not only to maintain the integrity of the human race, but to constantly improve its character.

This implies the improvement of the individual by bettering his antecedents, by protecting him from the folly and ignorance of his progenitors. It means the study, investigation and application of principles which will remove conditions unfavorably affecting future generations and creating those which tend to improve the offspring.

It is desirable that in the dependent stage of their lives individuals should be so cared for that they will pass through infant, child and young adult life into maturity with minds and bodies as nearly perfect as possible, and so trained as to be able to give their offspring the best possible care, besides transmitting to them a legacy of sound body and mind.

Parents should have good antecedents, a good environment, be properly reared, educated and taught not only the care of themselves, but of those for whom they are responsible and with whom they are associated in life.

This suggests the next phase, by which we seek to protect individuals from the acts of others by means of certain laws and regulations affecting their conduct. In this way the health and welfare of the community is conserved. This is of course part of a general welfare legislative plan, but there are many special problems which affect women and especially prospective mothers, which have to be very thoroughly understood and carefully worked out. It must not be forgotten, however, that all public welfare work, while it has definite and concrete results on the existing generation, has a more permanent effect on future generations and is therefore intimately associated with problems of heredity (which are really a part of a large maternal welfare program).

The family should be protected from various detrimental influences by education, legislation, proper help and advice. This means that each family should have a normal economic status, proper housing, etc., good sanitary surroundings, proper advice and care in case of physical or other needs resulting from disease, economic reverses, or distress of any kind. Some of the medical problems which vitally affect the individuals and the family are those



dealing with tuberculosis and venereal diseases. These activities are very closely allied to maternal welfare work.

A comprehensive maternal welfare program should include investigation into certain medical and social problems. This virtually constitutes a study of many problems connected with the production of human life. Some of these medico-social problems which vitally affect the individual, the family and the community, are those relating to sterility, whether apparent or real, to abortion, to premature births, and stillbirths, whether ante- or post-partum. A study of causes and methods of controlling promiscuous sexual relations and, from a medical standpoint, investigation into methods of eradicating venereal diseases are of the utmost importance in any maternal welfare scheme.

An analysis of the causes and practical application of the principles for preventing the development and transmission of degeneracy, insanity, physical defects would be of great benefit to the human race.

A careful and unbiased study of the causes of economic insufficiency of the family with its disastrous effects on the mother and children is one of the fundamental problems of maternal and infant welfare. An investigation of the causes underlying the diminishing birth rate resulting from increasing sterility, abortions, desire to limit the size of families, etc., is of prime importance to many countries.

These are some of the many important problems with sociologic and medical bearings which have a close relationship to a maternal welfare program.

It is necessary that some fundamental principles, definitions and plans be established for this sort of work in different countries. This is especially true where statistics are used and particularly where they are used for comparative purposes.

Of medical problems which need special investigation, there are many. Practically all conditions which complicate pregnancy, labor and post-natal conditions in mother or child need further study. Many of these are practically unexplored fields. Of the cause of eclampsia we are ignorant. We know practically nothing of the physiology and pathology of the child developing *in utero* and the effect of maternal environment, habits and diseases on the fetus.

The educational program involves the education of young adults along proper sex lines. This necessitates careful study and thought in laying out the educational program as well as in selecting those who are to give this instruction. It includes the education of prospective fathers and mothers in the physiology, hygiene, pathology, psychology, sociology, etc., of maternity and infancy.

Of the highest immediate and practical importance is the proper education and training of those who give prenatal, natal, and postnatal care to mother and infant. This includes doctors, midwives, nurses and social workers and the institutions which are responsible for their training.

The legislative program includes enactment of those laws which are designed to protect the family unit in health, economic independence and happi-

ness, or to prevent any invasion by medical or social disease. This means, of course, the protection of motherhood and infancy from disease, poverty and distress. The mother must not be forced into conditions of existence which will be detrimental to her or the future child. This means provision for proper maintenance, good living conditions, protection from disease, improper work, etc. Laws should protect the unborn child from death, disease, and harmful influences, in so far as this can be accomplished. Legislation should provide for the license and proper inspection of institutions and individuals to whom the care of mothers and babies is entrusted. There should be some assurance that they are properly trained and capable of carrying on their work.

Some provision must be made for the necessary institutions which include in addition to the educational institutions for training special workers, others such as communal medico-social centers from which medical and social activities in a given area should emanate.

Maternal and infant welfare activities make up an important part of the work. Of the work of these two groups, the "prenatal" and nursing clinics should be most closely coordinated.

Maternal welfare work should include some institution for the education of prospective parents, especially the mothers, where talks and demonstrations give them the necessary knowledge of themselves and their babies. Home visitors should go from these centers to the house where the women can be advised and taught in their own homes.

Provisions should be made to furnish proper prenatal, natal, and postnatal care in the home for both mother and newborn.

There must be adequate and proper provision for prenatal, natal, postnatal and other necessary medical, dental, nursing and social care including domestic economy, dietetic and nutritional work. It is necessary to have prematernity homes and hospitals, as well as maternity and gynecologic hospitals. Postnatal homes are necessary for those who need care for medical or social reasons. Public welfare activities are so intertwined that it is impossible to isolate one from another, but there is not a more basic work in the whole plan than that of maternal welfare. The mother is the keystone of the family unit and the whole arch of human welfare and progress is sustained by the weight which rests from all sides on that keystone.

Both maternal and infant welfare work are of the greatest importance in every country, but for many reasons they have been and are especially important in France. In practically all countries the infant and child welfare program has been developed more quickly and thoroughly than that of maternal welfare and of late has included more or less of the problems of maternal welfare. This is especially true in the United States.

The very praiseworthy activity of physicians and other welfare workers who have made a special study of infant and child life, together with the natural appeal which babies make to all, has contributed very largely to the success of their work. This should not lead us to neglect the more abstract and less tangible, but none the less great, results which may be derived from a properly worked out plan of maternal welfare.

This work is especially important for France because of the low and diminishing birth rate, the high percentage of sterility, the large number of abortions, the great number of stillbirths and high infant mortality especially in the first two weeks of life. The frequency of venereal diseases and tuberculosis make the early observation and careful study of all pregnant women of the greatest importance.

Professor J. M. Slemmons, who studied the obstetrical situation in France, and made his report to the American Red Cross in October, 1917, stated among other things that "thoroughgoing antenatal supervision, nevertheless, is a requirement of the very first order in France." Dr. DeNormandie in his report made less than a year later, saw the advisability of establishing a prenatal care program in France.

In September, 1918, the writer was asked by Major W. P. Lucas, head of the Children's Bureau, to investigate and report on the obstetric situation in Paris with special reference to prenatal care. In my report it was stated that "the great need is for social work in connection with the maternity hospitals and the establishment of properly conducted prenatal work would be the greatest boon to the mothers, to the maternity hospitals and to France. It is not necessary to discuss the value of prenatal work as a general proposition, but there are certain conditions in France which would make the establishment of such a work of more benefit to France than almost any other thing which could be done. The machinery for carrying on this work in Paris is already partly constructed but needs to be properly adjusted and supplemented. What is needed to perfect this system is closer contact with the patients and careful study of their actual home and economic conditions, not *en masse* but as individuals. Mothers should be treated with the greatest possible kindness and consideration, for they are the ones who make the greatest possible sacrifice for the benefit of others." Aside from this appeal for the sympathetic and intelligent care of prospective mothers certain statistics were cited showing some important points of attack in the effort to conserve human life.

It has been estimated and openly stated by publicists that there are now about 500,000 abortions annually in France. This exceeds the present number of living births. The number of women who enter hospitals for treatment of complications resulting from abortion is constantly increasing. In Paris during 1912, there were 4,220 stillbirths, which practically equaled the total number of deaths during the first year of life.

In France during 1912, there were 742,435 living births and 34,695 stillbirths. The deaths during the first fourteen days of life were 19,265, making a total of 53,960 deaths, most of which may be regarded as due to prenatal and natal causes. The remaining number of deaths during the balance of the first year of life amounted to 59,098.

The ravages of venereal diseases on both mother and offspring, the high mortality of tuberculous women who are pregnant, and the dire effect on their offspring make the detection of these diseases early in pregnancy of paramount importance.

The detection and treatment of other diseases accidental and incidental to pregnancy is, of course, of the very greatest importance.



The relief of social distress and disease is not less important than the cure of physical ailments and diseases. The happiness and well-being which can be brought to the individual mother, and those associated with her, by intelligent guidance, sympathy and help is unmeasurable. Perhaps the objects of this work may be concisely given by translating an outline which the author used as a means of interesting some of the French people in carrying on the work.

The raising of a fund was asked to establish and develop:

1. Medico-social work in connection with the maternity services of the hospitals of Paris.

2. Medico-social consultations for pregnant women in sections of Paris remote from the maternity hospitals.

3. Consultations for pregnant women in close association with the consultations for nurslings.

The aims of the work shall be:

1. To educate the prospective mothers how to best care for themselves and their families.

2. To develop their social and economic independence.

3. To give them moral support and assist them to obtain material aid when necessary.

4. To see that they take proper precautions to prevent and cure disease.

The results which may be attained are:

1. An improvement of family life.

2. A diminution in maternal and infantile morbidity and mortality.

3. A decrease of venereal diseases, abortions, stillbirths, and premature births.

4. An increase in the number of pregnancies and normal births. Finally by a study of the medico-social causes of depopulation, to reach a thorough understanding of the causes and at the same time the method of remedying these conditions.

Plan of work as put in operation: In September 1918, after the investigation of prenatal care mentioned above it was necessary to leave Paris to carry on some emergency war work, so that no further steps were taken until the latter half of December, when after some necessary preliminary arrangements, the work was begun in the 18th and 14th arrondissements and a little later in the Municipal Dispensary at Bicetre, where established clinics for nurslings and children were being conducted under the auspices of the Children's Bureau, American Red Cross. The general idea of the work was to get in touch with as many of the pregnant mothers in the community as possible. The contact was to be from both medical and social points of view in the consultations and the home as well.

It was not thought possible or advisable to attempt a large or complete work of maternal welfare, so certain definite objectives were determined. These were from a medical point of view:

1. Providing consultations for pregnant women easily accessible to them.

2. The establishment of a different type of consultation for pregnant women where the women would be periodically observed by a well trained medical man and not by a "sage-femme."

And also from a social point of view:

1. The demonstration that those who occupy a low social and economic level have other needs than spasmodic material relief, and that such relief should only be given after proper investigation and study of their needs, except in emergency.

2. The proving of the possibility of entering the homes of these poor people not only to study but also to help their morale and give such material aid as might be necessary. Many of the French people, especially those of the better economic and social class, have been very skeptical of the idea of home visiting.

3. Instilling the idea of cooperation and coordination in their relief work both medical and social.

The essential features of the plan were:

1. Medical supervision during as great a part of pregnancy as possible to prevent the occurrence of disease or detect its presence early and to improve the health of the patient. This is accomplished by demonstration of proper diet, clothing, personal and home hygiene, securing of as good environment as possible, and the use of appropriate curative measures for physical and social ills.

2. The giving of social care, including a study of all the problems which are not medical, with the object of raising the mother and, as a result, the family to a higher level of living. This is done by talking over their problems and giving advice and help in avoiding and solving their difficulties. They are visited in their homes and their needs are investigated with the desire to see that they secure material relief when it is necessary, but always with the thought of showing them how to be independent and solve their own problems wisely. They are especially helped to understand about maternity and care of infants. This is done by individual instruction and advice, also by getting them together into groups where they can be instructed in making the proper clothing for themselves and babies, in the necessary preparations of themselves and their homes for the confinement and the proper care of the babies. They are also taught how to improve their individual, family and home surroundings, especially in regard to food and hygiene.

3. To follow up the cases after confinement and see that both mother and baby are maintaining proper health under as good living conditions as possible.

The details of the plan are the establishment and maintenance of prenatal consultations in quarters where no consultations for pregnant women are easily accessible to them. These centers must have provision for both medical and social supervision of the cases; at the consultation itself and also in the home. In other words, there must be a connection between the consultation and the home of the patient by some plan of home visiting and instruction.

Advice, help and instruction may be given to groups of mothers in regularly conducted classes where instruction along various lines may be secured by them.

In an effort to reach every pregnant woman of the quarter as early in pregnancy as possible, and see that she received proper care and instruction

not only for herself, but later for the baby, contact was made with the "mairie," with institutions which care for mothers and also with those who care for the mothers in their homes.

A pregnant woman should be followed with care through her pregnancy and confinement and should later be guided into the consultation for nurselings. All this should be done not only for the benefit of the baby but also to keep her under observation to make sure that she is able to care for herself and her family in the best possible manner.

The prospective mothers were found by (1) securing from the "mairie" a list of those who applied for the "allocation;" (2) establishing a "liaison" with the maternity hospitals of the neighborhood, to obtain the names of the women registering in their consultations who lived in the quarters where the prenatal work was being conducted; (3) developing friendly relations with the "sages-femmes" of the section and helping them to give their patients better care; (4) reference of cases from other consultations as that of the Rockefeller Commission for Prevention of Tuberculosis and those of the Infant and Child Welfare Work; (5) the bringing of one woman to the consultation by another; (6) accidental contact with the home visitors.

#### INSTRUCTIONS FOR PRENATAL WORKERS

The following ideas and instructions were given by the author to those who were engaged in carrying on the prenatal work.

It should always be remembered in caring for pregnant women that they are worthy of all the help and consideration that can be bestowed upon them. They are often very uncomfortable, with symptoms incident to their condition, and frequently their mental and moral outlook is changed.

It should never be forgotten that one is dealing with a person who has as many or more human rights than any other person and that there is always potentially a second individual whose rights cannot be ignored from any point of view. It should be the aim of those who care for the pregnant woman to understand all the factors which interfere with her living in good health and happiness and which may interfere with the life, health, or happiness of her offspring.

We study disease in the individual to understand her exact condition and thus be able to use the best means to prevent and cure the particular affection of the individual. We treat a patient with typhoid fever to cure the individual, but we also look for the disease in others in order to find the source from which the disease arose. Many times it is very difficult, if not impossible, to discover the origin of diseases from the study of a single case, it is therefore necessary to study groups of similar cases in order to find the source and the cause of the trouble. We are then in a position from which we can attempt to prevent the occurrence of this disease not only in the individual, but also in groups of people. This we call preventive medicine.

In social work, we try to discover the causes of social and economic distress in the individual and seek to apply the remedy. It should always be our aim to discover the source of trouble for groups of people and to strive to remove the causes.



In medicine, it is impossible to control the spread of disease by dealing solely with individuals, it is absolutely necessary to understand and remove the causes from communities afflicted with the disease. We have to treat cases at the source to control the spread of disease. In society it is not possible to deal solely with the individual in removing social distress, the causes must be discovered, the source found and the trouble removed from groups, if the work is to rest on a permanent foundation.

It is only by understanding the causes and removing the sources of trouble that society will ever be able to exist constantly and relatively free from either disease or social afflictions.

The purposes of all medical and social work are not only to study and relieve the discomfort and suffering of the individuals themselves, but also to investigate and ultimately discover and eradicate the causes of these conditions in society as a whole. In order to carry on this work systematically it is necessary to have some record of the study of individual cases. It is, of course, possible to have records so elaborate as to defeat the immediate objects of the work. The ideal record should comprise only the absolutely essential information and only such items as can be secured with relative accuracy. They should be elastic enough to fit the needs of most cases and at the same time simple enough to be easily understood. It should be possible to compile data from these easily and thus obtain a study of groups from the information on the records of individual cases. In this way some of the ultimate causes and sources of difficulties may be found. The workers should never forget that records are in themselves not the object of their work, but are simply a means to an end. They serve as an outline to be followed intelligently, as a memorandum of the individual case and ultimately as a means of finding the cause and getting at the root of existing conditions.

Some explanation of the prenatal records, including the social histories, an idea of their purpose and an explanation of the information contained on them may be necessary.

After registration at the consultation, the patient was given a card to be enclosed in an envelope and retained by her at all times. The information on this card was the name, address, registration number and date.

The place of confinement was indicated and who was to care for her, the date of her last menstruation, of quickening and the probable time of confinement were recorded, any accidents of pregnancy were noted, the number of previous pregnancies was recorded and any important complications stated. Findings of importance were mentioned, the character of the pelvis, the condition of the urine and blood pressure were briefly given. The patient was not only supposed to bring the card with her to the consultation, but also show it to her attendant at the time of her confinement, so that the information secured at the prenatal consultation would be available for use by the obstetrician or midwife. Her attendant was asked to supply certain facts which were to be recorded on the card, as the date and place of confinement and any complications. The sex, weight, length and feeding of the child were noted on the card. The patient was supposed to bring this information regarding herself to the postnatal consultation; and that concerning the newborn to the

clinic for nurslings. The card also served to remind the patient of the date on which she was to return to the consultation.

The purpose of the card described above is, of course, apparent and it is not as elaborate as might be inferred, for the essential information regarding a case can usually be given in very few words. It is extremely important that the work of these different agencies be closely coordinated, and that a certain minimum of information regarding the case be passed along with the patient.

The social card gives an outline for the study of the living conditions of the family, i.e., an investigation of the members of the family and their habits and environments. This chart should be finally filled out after the worker has confirmed, in so far as possible, by personal observations, the statements made to them by members of the family. It may require many visits and much tact to secure the required information. Much of it can be secured without direct questioning by conversation and observation.

This chart is divided into five parts. (1) A study of the personnel of the family and those closely associated with them. (2) An investigation of the work of the different members of the family. (3) The observation of the housing conditions, which is extremely important, because it has much to do with their comfort, health and happiness. The accessibility of conveniences and necessities such as light, heat, and water, including plumbing and the general sanitation and crowding of occupants are very important facts to ascertain. (4) An analysis of the monthly expenditures of the family. (5) A record of the monthly revenue. The last two deal with the economic and financial condition of the family. This is a very delicate subject, but nevertheless extremely important, as it affords opportunity for making a partial diagnosis of many social afflictions. For instance, two families of the same size may be living in practically the same surroundings and both expending all of their income. One may have 50 per cent more revenue than the other, but through poor management or carelessness be reduced to the same economic level. Such a family should be taught how to live better, at least the rising generation should be shown how to improve their condition and not fall into the same errors. Another family, at one time independent, through misfortune such as sickness, death or loss of money, may be forced below their previous economic level. We could term such a class a marginal group because they live so close to the income necessary for independent living that any mishap or mismanagement reduces them to a financial condition where life becomes a mere struggle for existence. It may be possible to correct their condition by placing them in work of which they are more capable. It may be possible to alleviate their condition only by rendering assistance. It must never be forgotten that many of these afflictions are due to social and economic conditions which can be changed only by applying the remedies to larger or smaller groups of individuals. It is important to analyze the income and expenditures with reference to each other and to the different items making up the budget. It is perfectly possible to spend such a proportion of the income on food that the family is forced to live without other necessary or desirable things,

when with a much smaller expenditure, the family would be just as well nourished.

The medical records consisted of two cards. On one the history and results of physical examination were recorded. The information on this chart comprised the past history of the patient and her family, information of all previous pregnancies and labors, a history of the present pregnancy besides the record of a general physical examination as well as an obstetrical examination.

The other medical card was used for recording routine observations each time the patient returned. It was so arranged that this information could be written under the proper date in parallel columns. It comprised such information as the temperature, pulse, blood pressure, urinary findings, edema, etc.

One other card was used for the reference of cases to other agencies. The necessary information was given on this card and space was left for making a proper report back to the consultation.

The workers were taught to use these charts, but some difficulty was encountered because of the short time which we had to train them, and also on account of some unavoidable but rather frequent changes in personnel. On the whole they served their purpose well.

After registration and taking the social and medical histories, the patient was examined physically.

A certain routine was established in which all patients coming for the first time were given a complete physical, in addition to the obstetrical, examination. Any patient pregnant for the first time, or who gave a history of abortions, stillbirths, or specific symptoms was sent to the laboratory for a Wassermann test. Any case subjected to tuberculosis contact, or presenting suggestive symptoms, was sent for a special chest examination. Cases giving evidence of other diseased conditions were sent where they could receive appropriate care.

Cases were told to return at least once each month during the first seven months of gestation, and once each week after that period. In case they failed to return, the home visitor was asked to trace them.

The routine followed on each return visit was to secure the patient's weight, temperature, pulse rate, hemoglobin, blood pressure, and urine for chemical and microscopical examination. On each return visit, certain questions were asked regarding her general health, and a cursory physical examination was made. At the beginning of the last month of pregnancy, an obstetrical examination was made in all cases. Vaginal smears were not made and examined as a routine, but only in those cases which were regarded as suspicious. Special study and care were given to those cases which presented conditions which needed it. Postpartum examinations were also made.

Social work was established and carried on in the sections of Paris as will be enumerated and also in four of the maternity hospitals. Medical work was conducted in conjunction with the social work in the prenatal consultations which were established in the different arrondissements, but no medical work was undertaken in the hospitals, neither was any attempt made to modify



the routine of obstetrical work established there, though it failed to meet the ideals of any modern clinic for pregnant women. It was not thought to be tactful or proper to criticize or suggest too vigorously to men who, for nearly five years, had been driven to heroic actions to meet the demands of military medicine and surgery.

Special work was established in four of the maternity hospitals, and the author feels very strongly that it will be the beginning of a work which will be most vital in the future development of France, which has had and still has the most serious problem to solve in reference to natality.

It may be of some interest to give a brief summary of the work and some of the immediate results.

In the 19th arrondissement where prenatal consultations were being conducted, a visiting nurse was sent to the maternity services of Tenon and Lariboisiere Hospitals once each week to make follow-up visits to those who went from the 19th arrondissement.

We tried to help the mothers who were to remain home for the confinement make the necessary preparations.

In the social center a class was held once each week where mothers and expectant mothers were shown patterns of things they would need. They were taught how to care for themselves and their babies, and were given more or less personal instruction. They were also sent to food consultations.

Any cases suspected of accidental diseases such as tuberculosis and venereal infection were sent to special consultations for both diagnosis and treatment. Those women who presented any obstetric complications were sent to maternity hospitals for special care. The work was carried on in close cooperation with that of the Rockefeller Commission for the Prevention of Tuberculosis, and also with the Children's Bureau of the American Red Cross. Every mother who had a living baby returned to the Nourrisson consultation, three of which were carried on each week.

The nursing and visiting work was carried on by Mlles. Oelker and Durrleman under the supervision of Miss Nellie Reed of Washington. During the six months, about 200 pregnant women were taken care of in the prenatal consultations of this arrondissement.

The consultation at Bicetre was carried on by Dr. Lantz once each week, and a rather loose connection was established with Baudelocque Maternity.

In the 14th arrondissement, the work was carried on three times a week. The home visiting was at first under the charge of Miss M. McAlanny, and later was supervised by Miss N. C. Rudd, who did most excellent work. The same general plan was carried out so far as possible in the absence of a social center, and a less complete infant and child welfare organization than that in the 19th. Over 200 cases were seen during a period of less than six months.

In Bicetre the work was taken over and carried on by the municipality. In the 14th arrondissement, the Patronage Franco-American, in close connection with the "mairie," arranged for a continuation of the work. An "œuvre" was formed in the 19th arrondissement to carry on the whole plan of the work as established there. (The name of this organization is "Pour l'Enfance et la Familles par l'Aide Sociale.")

May 1st, 1919, social visiting work was established (in four of the Maternity Services) in Baudelocque, it was carried on under the leadership of Miss N. C. Rudd with the help of Mlle. Nageotte. The work was established and conducted in St. Antoine Maternity by Mlle. Oelker, while that which had already been started at Tenon and Lariboisiere was continued under Mlle. Durrleman.

The plan of the work in the hospitals is as follows:

I. Social service at the Consultations.

1. Inquire of each patient what can be done to help her.
2. Inquire about the doctor's prescriptions and whether the woman knows how to and is able to have them carried out.
3. Find out whether she knows what to prepare for herself and her child and see that she does it.
4. Follow-up and see that she attends the consultations as often as she should.
5. Supply her with the needed help, and check it up by the "Fichier Central."
6. In places where a visiting service exists (14th and 19th) give the names and addresses of pregnant women to the "visiteuses" with the necessary instructions. A report should be returned concerning housing and living conditions and should be sent to the hospital.
7. In the other arrondissements, make the necessary visits in as great a number of cases as possible. Follow especially the important cases.
8. Cooperate with existing "œuvres."

II. Social Service in the Hospital:

1. Visit the wards—keep in contact with all the "accouchees" and give them the social help needed for them to adapt themselves to their new problems. Help those who are going out and see that the housing and hygienic conditions are as good as possible. Follow them up, help them to take up a normal healthy life, and see that they bring their baby to the "consultation des nourrissons."
2. Organization of practical talks for future mothers, either frequenters of the consultations or who have been admitted to the "expectant" wards on: How a pregnant woman should dress; how to prepare the layette; practical demonstrations of care to be given to the newborn baby; practical lessons in personal hygiene; how to improve the hygiene of the house, etc.

An organization was formed to carry on the "medico-social" work which was installed in the hospitals. The name of this organization is "Service Medico-social des Maternites."

The author feels constrained to mention by name some of those who contributed by advice and cooperation to the success of this work. The names of some of these have been mentioned above. The seed which has been planted will be sure to grow and bear fruit under the attention of such men as Prof. Couvelaire, Bouffe-de Saint Blaise, Demelin and Funck-Brentano with the able help of their associates, Drs. Sellet, Desvraigne, and others. The help of Matte Brunot, Drs. Le Sage and Broudic and Mlle. Chaptal was greatly ap-

preciated and it would have been impossible to have developed and carried on the work in the 14th arrondissement without their help.

The author was also helped greatly by the advice and encouragement of Drs. W. P. Lucas, R. S. Haynes and T. B. Cooley, as well as by the cooperation of Dr. W. J. French, who had charge of the infant and Child Welfare Work in the 19th arrondissement. There were many others, among whom might be mentioned Miss Asche and Miss Ellen C. Babbitt.

In closing it may be well to remember that this work was carried on in a foreign land, and that if it has achieved any success, it is only through the sympathy with, and toleration of, Americans and their ideas by the French people themselves.

730 LA SALLE BUILDING.

*(For discussion, see p. 200.)*



## THE IMPORTANCE OF A FOLLOW-UP SYSTEM FOR OBSTETRIC PATIENTS\*

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IN these days of "health conservation measures" the question may well be asked whether the recently delivered mother in either private or hospital practice is accorded as much attention in a follow-up sense as a patient recovering from medical or surgical illness. It is now commonly regarded as essential to the proper functioning of a hospital that each patient be kept under observation during a definite period after discharge and to report for examination at stated intervals or be visited by the social service worker. Thus, not only the immediate but the later results of treatment are known and can be acted upon. In surgical cases, particularly, the final physiologic, as well as the anatomic outcome of the particular operation is insisted upon as a matter of record and study. Does this development in modern methods apply with equal force to obstetric patients? Is proper care extended for a sufficient length of time after delivery to obviate the possible production of pathologic lesions and to provide for their correction if noted? Laudable and constantly increasing attention has been accorded by maternity institutions to provisions for antepartum care, both for the sake of the mother and her unborn child. A thorough physical examination of the prospective mother is urged, and with blood pressure observations, urinalyses, pelvic measurements, etc., regarded as essential in every well ordered maternity. But once the interest and excitement attendant upon delivery is over, the patient in many cases is discharged with a cursory examination at the end of a stated period and little more attention paid to her. This also applies in many instances to private patients. There is no reason why this condition of affairs should be allowed to exist. Although accepted as physiologic, the process of parturition verges so closely upon the pathologic, that it is often difficult to draw a line of demarcation. Moreover, the process of involution is by no means complete when the patient is able to be out of bed, and complications may develop and escape notice if a pelvic examination is not made after the usual period of two weeks in the hospital. We may briefly inquire at this point into these possibilities and then discuss means for their correction. The usual method of postpartum examination when it is conducted, takes note of the breasts, the degree of uterine involution as determined by the lochia, the size of the uterus, its consistency and mobility, the state of the adnexal organs, the condition of the cervix and perineum. If the results of this examination are fairly satisfactory, the patient is ordinarily discharged and in many cases not seen again unless complica-

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tions develop. Let us consider these points somewhat more in detail, although we may be accused of dealing with trite and elementary facts.

The involution of the uterus as already stated, is usually gauged by the size, consistency, and character of the lochial discharge. Ordinarily the bright red lochia should disappear after the eighth or ninth day, but inquiry will often elicit the fact that in a great many cases the bright discharge reappears after the patient has been up for several days. A bloody discharge means a halt in the process of uterine involution and above all requires rest in bed with the possible administration of oxytocic measures. A considerable amount of blood may be lost unless this condition is promptly checked, and not only does the patient suffer from this, but the congested uterus is more apt to be displaced either downward or backward. As concerns malposition of the uterus we often find an apparently normal anteversion at the end of ten or twelve days converted into retroversion if the patient be examined again four to six weeks later. This is usually accompanied by enlargement and congestion, which have probably contributed to the displacement. If appropriate measures are not immediately instituted, involution is further retarded and the uterus may remain permanently in this abnormal position. At this time postural treatment is indicated, including the knee-chest position, the so-called kangaroo walk, and having the patient avoid lying on her back. The bowels must also be kept open and oxytocics administered to reduce the size of the uterus. There is no value in the use of pessaries at this time and they should not be employed until the uterus has involuted properly and has been returned to its normal anteverted position. I have recently observed several cases in which retroversion pessaries have failed to retain the enlarged uterus. The possibility of these malpositions shows the necessity of making regular pelvic examinations at the end of the first and second month; otherwise the condition will be overlooked.

Perineal lacerations should also be observed at regular intervals. I have seen a perineum only partially healed at the end of the tenth day, yet the patient was discharged from the care of the hospital and physician. The process of repair varies with the general condition of the patient. In some it takes place quickly and a good result is present at the end of a week. In others a failure occurs because of the inherently poor character of the tissues or because of extensive trauma. In the former there is nothing to do except to reoperate at a later time. If infection has resulted or sloughing in the case of bruised tissues, operation must be postponed. Secondary perineorrhaphy at the end of ten days or two weeks is often followed by good results where the lochial discharges are fairly clean, but in the presence of a continuous foul lochia such intermediate operations had best be deferred and the wound allowed to heal by granulation. There is another class of perineal lacerations that must be noted, namely, those involving the sphincter ani that have not been diagnosed immediately after delivery. Several cases have come to my notice in which after a week or ten days with apparently normally functioning sphincter ani muscles, incontinence followed and examination showed that an attenuated sphincter was either torn or exposed in a perineal tear that had failed to heal. Such cases can usually be satisfactorily operated on at the end of two

weeks. Episiotomy, either lateral or central, provides for better healing in many cases and while I hesitate to recommend routine operation, I think that it serves a good purpose in those cases where a rigid outlet impedes the extension and delivery of the head. Lateral episiotomy has the advantage of being somewhat further away from the course of the lochial discharges, but is more difficult to repair and the resulting scar may be more painful than in the central variety.

The importance of unhealed cervical lacerations has been underestimated. The minor degrees undoubtedly heal without much disturbance, but in many cases the bilateral tears fail to unite, and considerable eversion of the anterior and posterior lips results. This exposes the lining membrane of the cervical canal and so-called "erosions" of the cervix usually follow. Unhealed lacerations of the cervix offer an opportunity for the absorption of septic material that undoubtedly in a great many cases leads to milder grades of infection involving the cellular tissue in the lower portions of the broad ligaments on either side and also the area back of the uterus included in the region of the sacrouterine ligaments. The course of this infection is insidious but is probably an important factor in producing the backache which so many women complain of during the first year after childbirth. A careful examination of postpartum cases within the first few months after delivery has demonstrated quite clearly to me that this is a complication to be reckoned. It may be avoided to some degree by treating these so-called ulcerated areas as soon after delivery as possible by appropriate local measures. In a series of hospital cases which I examined recently, every lacerated cervix was exposed through a bivalve speculum and the raw surfaces swabbed with nitrate of silver or iodine. The patients were then directed to return to the hospital at least once or twice a week for further treatment. I have also followed this out in my private cases and I think with good results in so far as a limited number seem to have been free from further complicating symptoms. The immediate repair of cervical injuries might be referred to at this point. Some years ago at the Lying-in Hospital every primiparous cervix which was lacerated was immediately sutured, but we found a marked rise of temperature in so many cases that we discontinued the procedure and limited suture of the cervix to the advanced degrees where it was necessary to control hemorrhage. I do not believe, however, that in the majority of cases proper normal healing of the cervix results, as we find a great many instances in which the marked eversion of the lips already referred to shows that union has failed to take place.

The abnormalities noted include the commoner postpartum lesions to which others may be added, such as mild degrees of pelvic inflammatory processes, particularly of the tube; involvement of the urinary tract, urethritis, trigonitis, cystitis, and pyelitis, which often are not disclosed until several weeks after labor; relaxation or inflammation of the pelvic joints; phlebitis of the pelvic veins, and finally among the more unusual conditions, degenerative changes in fibroid uteri or torsion of pedunculated ovarian cysts. Any one of the above may escape notice or may not have been present at the usual time of antepartum examination. In many instances the occurrence of such lesions



may not have been preventable, but whether or no, timely recognition and treatment will at any rate reduce the invalidism which often follows in their wake.

In the hope of stimulating a more general interest in a follow-up system, particularly for institutional patients, the writer recently undertook the circulation of a questionnaire to obtain some information as to the actual methods which had been employed by various maternity hospitals. (A copy of the questionnaire is appended.)\* A total of over 60 were sent out and replies were received from 48 American institutions.

An analysis of the results shows that 36 out of 48 have some sort of a follow-up system for their obstetric patients, including regularly organized clinical facilities in charge of the attending staff. In the majority (28) the patients only return if abnormalities develop, but are not directed to report at stated intervals after delivery. In 31 institutions a social service system is maintained by nurses for following their cases and some provision is made for babies in 37 institutions. Provision for the treatment of gynecologic conditions noted after labor is made in 37 maternity hospitals and in 11 they are referred elsewhere.

The admission is made by practically every one who answered the questionnaire that a follow-up system for obstetric patients is not only desirable, but necessary. In this connection the difficulties attending the institution of such a system for hospital patients must be acknowledged. A woman who is busy with the care of her family is not always able to come back for subsequent examinations unless the condition is serious enough to compel her attendance. This applies particularly to patients that live a considerable distance from the hospital, but should not apply to private patients who ought to be encouraged to visit their physician at least once a month for three months subsequent to delivery. If this is not feasible, arrangements might be made with a local physician. In the case of hospital patients the follow-up system is favored by the employment of visiting nurses, just as is now done by surgical, medical and gynecologic services. A number of institutions have already adopted this plan and if the visiting nurse finds any gross abnormalities, a hospital physician visits the case, or the patient is directed to an institution. The organization of so-called "maternity center associations," as in New York City, may be of great value in the development of this scheme, especially as their clinics are ordinarily located nearer the patient's home than the hospital in which she was confined. Co-operation and co-ordination could, it seems to me, bring

### QUESTIONNAIRE

AN INQUIRY INTO A FOLLOW-UP SYSTEM FOR OBSTETRICAL PATIENTS

Hospital.....

Reporter.....

1. On what day after delivery is the puerperal patient discharged?
2. Is the patient directed to come back to the hospital at a stated time, or only if abnormalities develop?
3. Is there any definitely organized postpartum clinic provided on certain days to which patients may apply?
4. Under whose charge is the clinic—attending surgeon or house staff?
5. Do attending surgeons see their cases at definite periods after discharge?
6. Are notes taken of such subsequent visits?
7. Have you any method of following up cases at their homes by social service workers or nurses?
8. Have you any information based on your cases of the proportion of postpartum women examined in whom the following conditions have been noted: Malpositions of the uterus, exudates, cervical erosions, lacerations, condition of perineum and results of perineorrhaphy?
9. In the event of lesions being found, what facilities are provided for their treatment in the same or other institution?
10. Are such operations done by your attending staff?
11. Are steps taken to insure proper supervision of the baby by visiting nurses or reference to pediatric clinics?

about a working agreement in which the function of the maternity center could be increased in a most valuable fashion and the hospital perhaps saved a certain amount of trouble and expense.

A regularly organized postpartum clinic should be part of every maternity hospital equipment. To this clinic every mother should be directed to come at stated intervals if possible. At such subsequent visits abnormalities which have developed since the discharge of the patient from the hospital can be detected and appropriate treatment instituted. Patients that present gross lesions, such as unhealed lacerations, uterine displacements, pelvic tumors, and other conditions, could be kept under observation and treated surgically if the occasion demanded. It also seems desirable that gynecologic operations be done either in the same or related institutions so that the patient remain under the observation of the same attending staff through the entire period. Such postpartum, or we may call them gynecologic clinics, should be under the direct supervision of attending surgeons, and, if possible, especially in the cases of operative deliveries, the operator personally ought to make the follow-up observations.

Admitting the value and necessity of adequate observations on postpartum cases, what may be considered a practical scheme for developing this for institutional or private patients? The return of every recently delivered mother to a state of health at least approximating that before her pregnancy, if not surpassing it, should be the aim of every maternity service and also every physician who takes care of obstetric cases. It is difficult to estimate how large a proportion of invalidism in women who have borne children can be traced directly to abnormalities of their pregnancy, labor, or puerperium, but it cannot be denied that the proportion is a considerable one. The tendency of modern medicine has been towards prevention. Can it be said that this effort has been sufficiently developed in the handling of woman's most important function in life? The results of childbearing cannot be expected to leave every woman in as good condition as she was previous to parturition, but an attempt should be made to diminish the proportion of invalidism as much as possible. I believe that this can only be done by concerted effort; by impressing, on the one hand, upon our institutions and physicians the necessity of keeping these women under a longer period of observation than has hitherto been the case, and, on the other hand, impressing upon the patients and their families the necessity and advisability for such supervision. A prolonged period of education may be necessary to accomplish this desirable end, but what has been accomplished in the domain of the contagious diseases, of cancer, of venereal disease, and other conditions, can likewise be duplicated in our obstetric practice. The survey of the situation which I have previously referred to, shows that in so far as maternity hospitals are concerned, great variation occurs as to the extent to which postpartum observations are carried out. It is unnecessary to refer to specific institutions, but it was found that in many instances patients were dismissed in from ten to fourteen days after delivery without any definite instruction to return for subsequent observations. In other cases, the social service workers or follow-up nurses visited the patients in their homes in conjunction with the work done with the babies. It is, of course, a difficult matter for large institutions to maintain a sufficient staff of follow-up nurses to see all

their cases, especially those living at a distance from the hospital, and, as already stated, it is a difficult matter for many of these patients to make personal visits to the hospital for examinations, but it ought to be possible to overcome these difficulties in most instances. Recommendations cannot be made in a general paper of this kind that would be suitable for individual institutions, and this matter must be left to the indications demanded by each particular case. Hospitals with patients residing in their immediate vicinity ought not to have any difficulty in bringing them back for subsequent observation on stated days, when a clinic in charge of a physician could provide for the necessary examinations. This is excellent training for the younger men who would learn by repeated observation on the same patient the course of involution after labor and other postpartum conditions. Many of the simpler lesions can be immediately corrected and those of a gross character kept under observation for possible future operation.

Such reformation of the accepted routine of obstetric hospital facilities as I have suggested will undoubtedly mean in most cases additional equipment and services that hospital managers may find it difficult to acquire under present conditions. But if it is the privilege and duty of our specialty to supervise the process of gestation from the time of conception through the delivery, this must also include the entire puerperal period, and a revised conception of the length of the latter beyond the usual ten days must be made to prevail.

Hospital standardization is the cry of the hour and in so far as this applies to obstetric institutions, it must be made to take cognizance of the fact that responsibility toward the recently delivered woman does not cease with her discharge on the tenth or twelfth day, and the shortcomings of institutional work apply with equal force to private practice.

There is another phase in discussing the question of appropriate and longer postpartum care to which in conclusion attention may be directed. Sociologists have seen, perhaps before the medical profession, the advantage of proper and more prolonged care after childbirth and have sought to attain this end through the medium of compulsory maternity insurance developed under state auspices. That the working classes might benefit by a scheme whereby a period of recuperation after labor could be secured is a question that must be given serious consideration, and much as we may have in general revolted against all plans of compulsory state health insurance thus far proposed as too paternalistic, socialistic and un-American, some modification of such plan may prove a desirable means of lowering the morbidity and mortality of childbearing. The subject is one that the profession may well consider from the standpoint of constructive rather than destructive criticism.

During the last decade the development of standards for prenatal care has marked a great advance in our specialty in which we were led or goaded, perhaps, by certain lay influences, but in conclusion I may venture a prophesy and hope that the next decade or two will witness an equal acceptance of the fact that more prolonged and studied observation of the postpartum period is a part of the responsibility which as conscientious physicians we owe to our patients.



## INDICATIONS FOR OPERATION IN SPREADING PERITONITIS OF POSTABORTAL AND POSTPARTAL ORIGIN\*

BY JOHN OSBORNE POLAK, M.Sc., M.D., F.A.C.S., BROOKLYN, N. Y.

**P**OSTPARTAL and postabortal peritonitis originates in the pelvis, from the inoculation by infective organisms of wounds in the genital tract or by extension of endometrial inflammations along the tubes or through the parametrium to the pelvic peritoneum. Because of the peculiar anatomy and lymphatic distribution of the female pelvis, the infection usually remains confined to the serous coats of the pelvic structures and the parietal peritoneum.

From an extended study of the autopsy findings in patients dying from postabortal and puerperal conditions, as well as from many observations made at the operating table in cases of postpartal and postabortal pelvic inflammation, we have been impressed with the complete anatomic isolation of the pelvis which generally obtains. This is favored by the routine employment of the elevated trunk posture of Fowler, which has become so universal in the conservative treatment of pelvic infection.

The similarity of the anatomic findings has been constant in every case where the uterine fundus did not reach out of the pelvis beyond the confines of the loop of the sigmoid. It mattered not whether the inflammatory reaction was confined to the true pelvis, or had extended upward into the general cavity. Nature's attempt at isolation was always present, varying only in its completeness. Peritonitis of postabortal or gonorrheal origin generally remains confined to the pelvis unless the infecting bacteria are particularly virulent, or the tissue resistance is low, or unless Nature's plan of isolation is disturbed by meddlesome manipulation on the part of the attendant. There are several reasons why this pelvic localization of the inflammatory process takes place. First, because the infection reaches the peritoneum through either the tubes or parametrium, and consequently the peritoneal reaction is either due to the leakage from the abdominal ostium of the tube, or the exudative infiltration which takes place through the serous coat of the tube or of the parametrium. The tubes through which much of the infective material escapes because of their increased weight, early drop into the culdesac of Douglas, and therefore deposit their infective material and exudate low in the pelvis, and necessarily the most active peritoneal reaction is at or near this point. Second, the peritoneal reaction usually remains localized when the uterus is within the confines of the pelvis, for the sigmoid falls over the infected area and becomes adherent to the uterus, bladder, fundus and parietal peritoneum, thus isolating the infected pelvis from the general cavity. (Figs. 1 and 2.) On the other hand, in puerperal peritonitis, the primary seat of the infection is in the uterine endometrium which in turn is drained by the uterine and parametritic lymph channels. These pass along through the uterine wall to the

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perimetrium or in the cellular tissue of the broad ligament and excite a parametritic reaction and empty into the iliac and lumbar glands. If the infecting organism is virulent but little localization is produced and the infection rapidly reaches the peritoneum, but when a parametritis is excited, there is a subperitoneal edema of the overlying serous coat. This distorts and displaces the peritoneal endothelium and allows the inflammatory exudate to be poured out between the cells into the peritoneal surface. These surfaces owing to the high

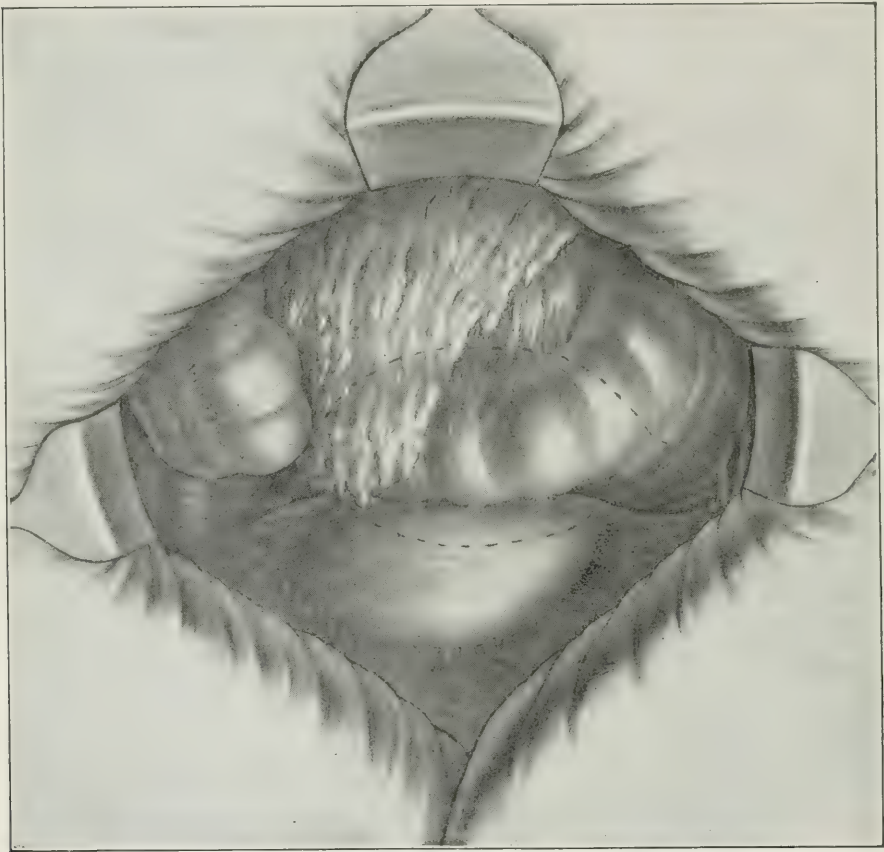


Fig. 1.\*—View of viscera through abdominal incision, showing isolation of the pelvis by inflammatory adhesion of the sigmoid, omentum and cecum to the fundus of the bladder.

position and the size of the puerperal uterus come in contact with intestinal coils, and furthermore, the pelvic brim is blocked by the ball-valve action of the enlarged uterus and gravity drainage is interfered with. Hence the exudate as it is poured out, instead of gravitating downward into the true pelvis, is poured out into the spaces between the intestinal coils forming adhesions; or if the exudate is virulent, ascending into the general cavity. Therefore it will be seen that there is a distinct difference in the pathology in postabortal and gonorrheal peritonitis with the uterus well within the confines of the pelvic

\*Illustrations in this paper are from "Pelvic Inflammation in Women" by John Osborne Polak, M.D. —D. Appleton & Company, New York, N. Y., 1921.

brim, and the pathologic changes which may take place in the peritonitis complicating the puerperal state.

Ordinarily when the infection reaches the peritoneum a tissue reaction takes place in this structure and a plastic exudate is poured out. This usually seals off the general cavity from the infected area by the formation of adhesions with the adjacent viscera. During this reaction there is always an elevation of temperature, and an acceleration of the pulse rate, a leucocytosis and a relative increase in the polymorphonuclear percentage with more or less abdominal distention, abdominal tenderness and local tension directly over the inflamed area.

Under proper treatment such as the Fowler posture, an ice-bag over the abdomen, morphine and proctoclysis, the general symptoms gradually subside, unless the pelvic isolation is incomplete as is the case when the puerperal uterus with its perimetritic exudate is well out of the true pelvis, or the bacterial invasion is so overpowering as to overcome the leucocyte and plastic reaction. In which case instead of the abdominal symptoms subsiding, evidence of extension

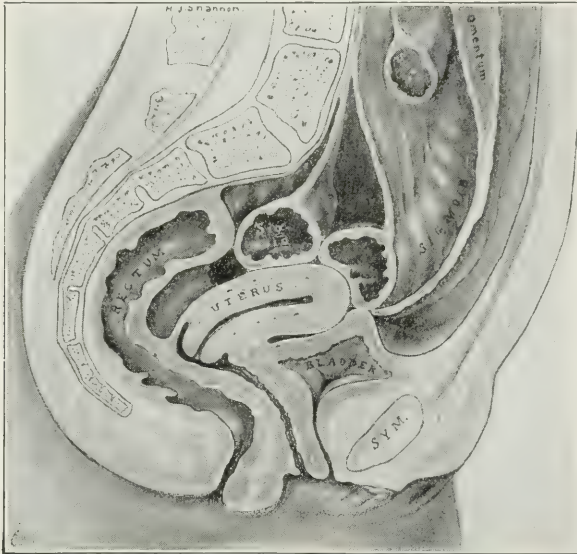


Fig. 2.—Schematic sagittal section showing relations in Fig. 1.

becomes apparent. This is manifested by an increase in the abdominal pain due to peritoneal reaction and increased peristalsis, and an increase in the area of abdominal tension and distention.

There is also an increase or a persistence of the temperature reaction and an increase in the rapidity of the pulse rate. But far more important than these clinical evidences of extension is the increase in the polymorphonuclear percentage. This is always increased in spreading peritonitis no matter how high the leucocytosis may be. When this symptom-complex; namely, the increase in abdominal pain, tension, distention and polymorphonuclear percentage is present, conservative treatment should cease and drainage should be promptly established. Whether this drainage should be made through the culdesac of Douglas or through



a stab-wound incision, must be determined by the type of case with which we are dealing.

In the postabortive and gonorrheal type, free culdesac incision usually results in the escape of thin, cloudy, blood-stained serum; for when the uterus is not sufficiently enlarged to block the pelvic brim, the Fowler posture will allow

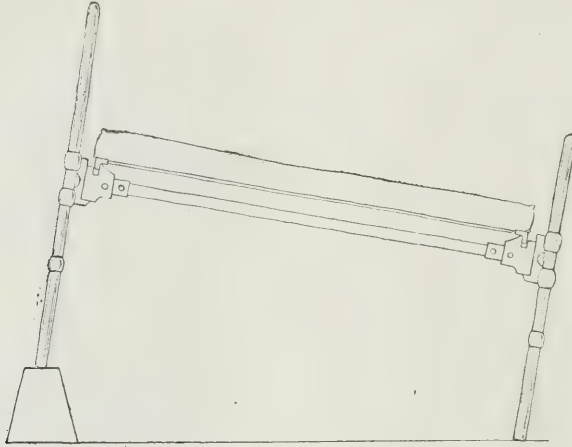


Fig. 3.—Elevated trunk posture, using the ordinary bed.

this virulent exudate to gravitate into the lowermost part of the peritoneal sac; namely, the culdesac of Douglas, and consequently culdesac drainage will relieve the patient from absorption of toxins by the lymphatics of the peritoneum. Such drainage is usually sufficient to give nature the necessary assistance in isolating the pelvis from the general peritoneal cavity.

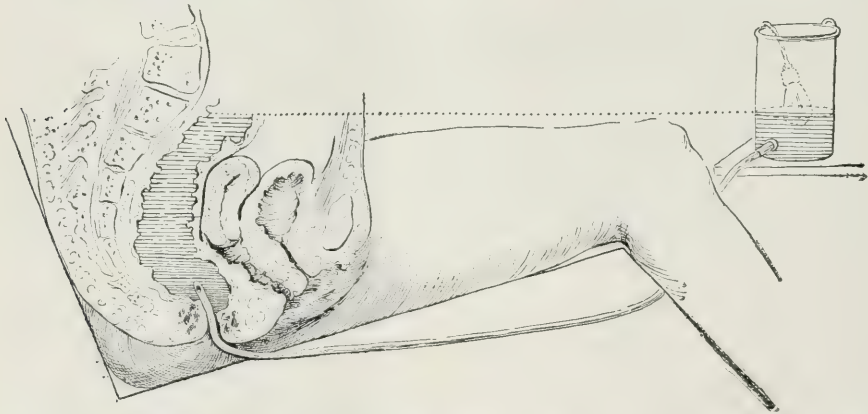


Fig. 4.—Harris drip with patient in Gatch frame showing level of fluid in reservoir and sigmoid.

In other words, in an early spreading peritonitis of this type, by early culdesac drainage we are able to change what is becoming a general involvement into a local pelvic peritonitis or pelvic abscess.

On the other hand, in puerperal peritonitis with these same evidences of extension if the pelvic brim is blocked by the ball-valve action of the large puerperal uterus, culdesac drainage does not offer the same advantages.

While we have felt for years that but relatively few puerperal deaths were due to peritonitis, yet there is a sufficient number of these infections in which the peritoneum is involved, in which there is a distinct place for the employment of the surgical principles of drainage. The expectant treatment of puerperal peritonitis has such a high mortality, owing to the peculiar physiologic and anatomic changes which take place in the blood and lymph channels during the pregnant state, that the absorption of toxins and the resulting toxemia both from within and without the intestines play havoc with the individual resistance and deprive the patient of nourishment, fluid, and oxygen. The heart muscle

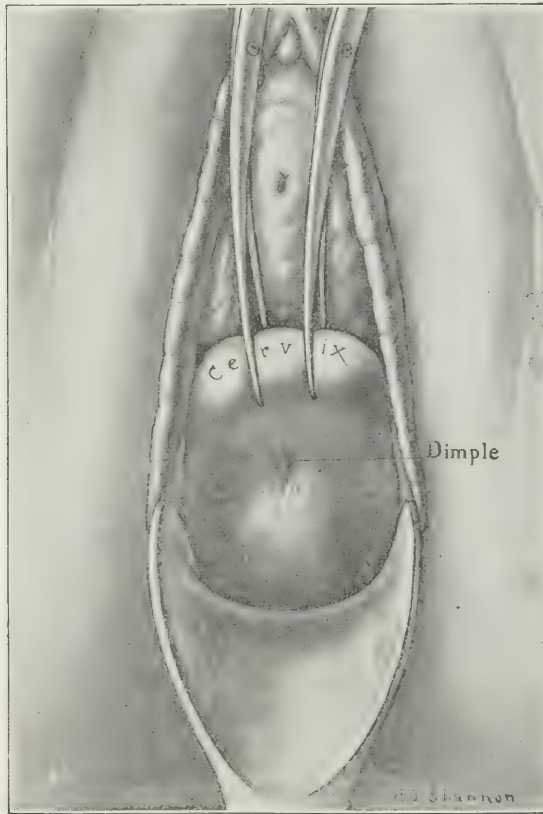


Fig. 5.—Technic of posterior vaginal section. Cervix drawn forward with tenacula, showing dimple at point of incision.

is likewise poisoned so that the blood pressure falls and there is general disfunction of the emunctaries. Consequently any procedure which offers an improvement in our results should be tried with courage and conviction.

During the past two years we have treated twelve cases of spreading peritonitis of postabortal and puerperal origin with abdominal drainage. In the first two we were not sufficiently clear as to our indications and the drainage was resorted to rather later than in our subsequent cases. One of these patients died. In the next ten, where the significance of the symptom-complex already referred to was more fully appreciated, drainage was promptly established on

the demonstration of the high polymorphonuclear percentage. Six women recovered and four died. This gives us a total recovery of seven out of the twelve cases treated, which is certainly more encouraging than that of any previous method of treatment.

Our general plan of management of these cases has been as follows: On admission to the hospital after a careful history has been taken which always suggests the origin and course of the infection, the patient has a detailed physical examination which includes inspection of her general appearance, tongue, facies, peripheral circulation and abdominal contour. The heart and lungs are next examined and the blood pressure and pulse pressure taken. The abdomen

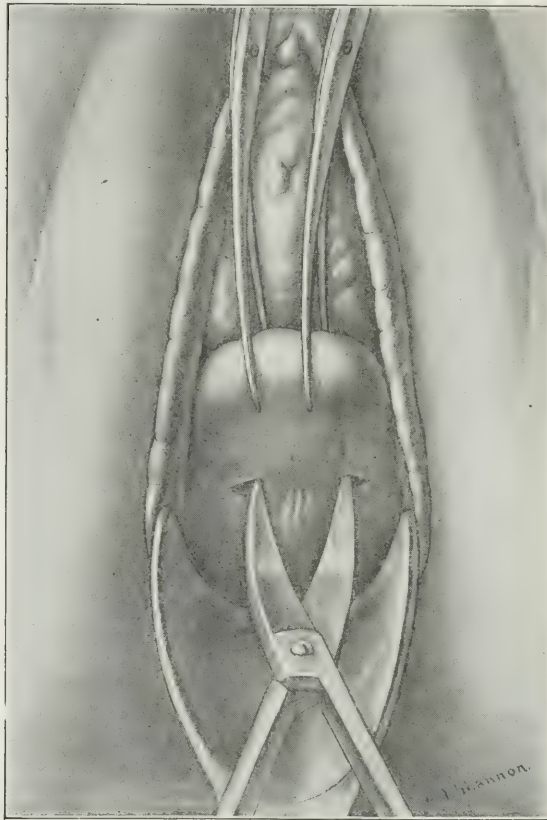


Fig. 6.—Posterior vaginal section, showing incision through the mucosa.

is next palpated to determine the degree of distention, tension and local areas of tenderness. A complete blood count is made, and likewise a blood culture. The patient is then placed in the high Fowler (Fig. 3) position; one or more ice-bags applied to the abdomen and a proctoclysis by the Harris method (Fig. 4) of glucose-bicarbonate of soda solution begun. The pain is relieved by a routine morphinization, small doses being given hypodermically at regular intervals, and the pulse, temperature, respiration, leucocyte count, and polymorphonuclear percentage recorded. If the patient's resistance is capable of taking care of the peritoneal invasion, in twelve to twenty hours there will be a definite recession



in the severity of the symptoms and a fall in the polymorphonuclear percentage. On the other hand, if her resistance is insufficient, or the virulence of the invading organism greater than the protective reaction; the pulse, temperature, and local abdominal symptoms will remain stationary or increase in severity; and most important of all, the polymorphonuclear percentage will rise. In the presence of these conditions drainage is imperative. One does not need to find a palpable exudate in the culdesac before making a posterior vaginal incision through the fornix. (Figs. 5, 6, 7, and 8.) Such an incision in the presence of the symptom-complex such as already described in postabortal cases will usually

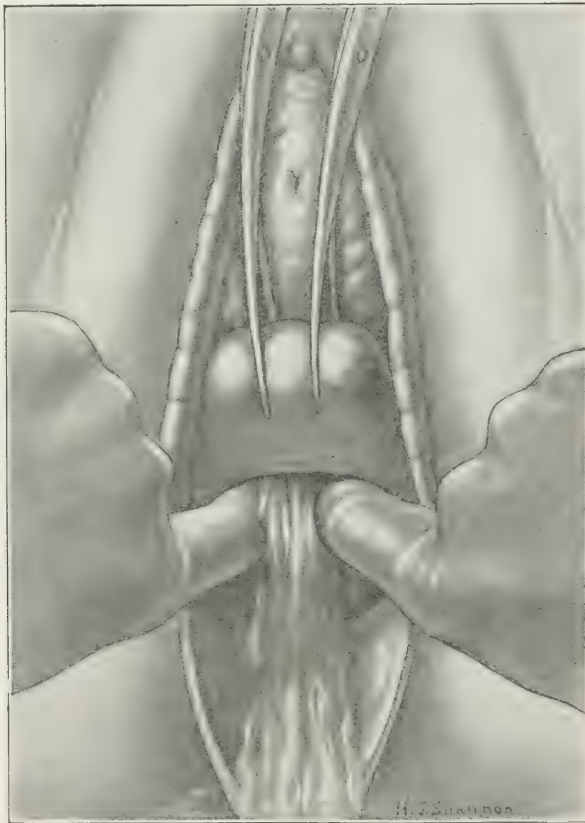


Fig. 7.—Colpotomy incision widened by fingers.

be rewarded by the liberation of a pint or more of thin, flocculent blood-stained serum which on culture returns numberless streptococci. This is also the case if the uterus is reasonably well involuted and within the confines of the pelvis. If the uterus is large, extending beyond the brim, stab-wound drainage just above the pubis and the introduction of a tube or cigarette drain behind the uterus, which is brought out through the abdominal incision, with stab-wound incisions and drainage in both loins, just external to the ascending and descending colon, will frequently give prompt relief by the release of the peritoneal exudate. After these incisions have been made the usual treatment of peritonitis, namely,

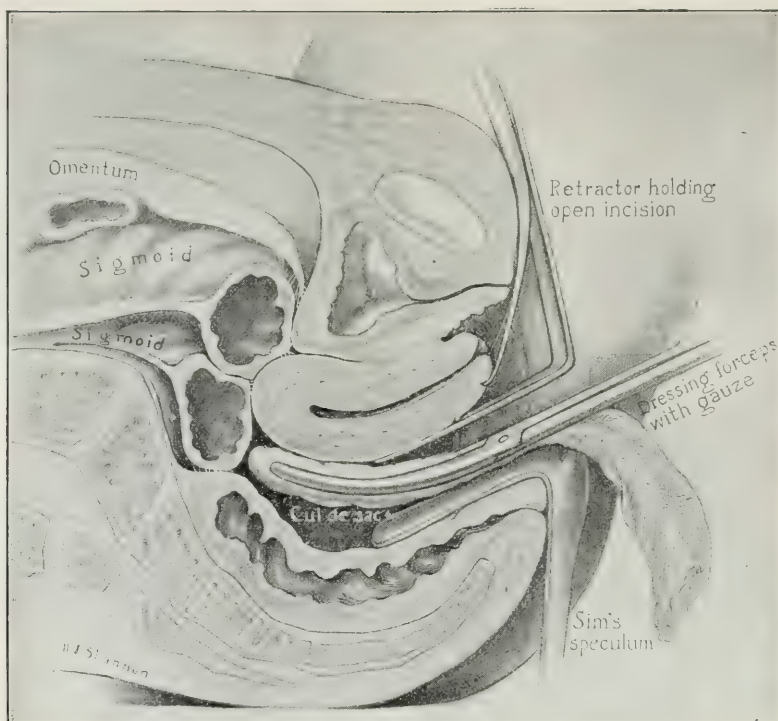


Fig. 8.—Schematic section of pelvis showing introduction of gauze into culdesac between two retractors.

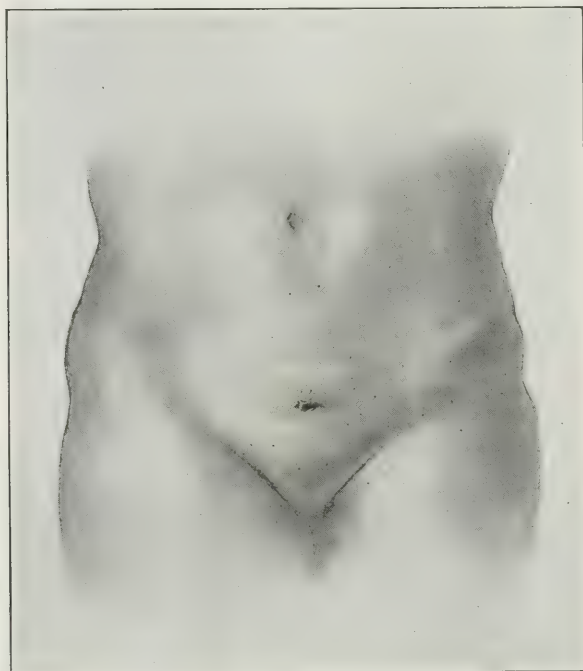


Fig. 9.—Showing site of suprapubic stab-wound drainage.

posture, proctoclysis, starvation, lavage and intestinal rest by morphinization must be continued until the tension is relieved, the intestinal distention subsides, normal peristalsis is established and the temperature, pulse, and polymorphonuclear percentages fall. When this has been accomplished, our drainage has succeeded, and not until these clinical evidences are apparent should any food or nourishment be allowed by the stomach.

From our observations in the clinical study of postabortal and puerperal peritonitis we have drawn the following conclusions: First, that nature is competent to localize the lesions in the large majority of peritoneal extensions. Second, that advancing peritonitis has a definite symptom-complex which is constant when the inflammation is spreading. Third, that in the presence of this symptom-complex drainage is necessary and definitely lowers the mortality.

287 CLINTON AVENUE.



## ERRORS IN GYNECOLOGIC DIAGNOSIS DUE TO MISPLACED ORGANS\*

BY REUBEN PETERSON, M.D., F.A.C.S., ANN ARBOR, MICH.

PROGRESS in obstetrics and gynecology is denoted, among other things, by greater accuracy of diagnosis. When mere opening of the peritoneal cavity, more often than not, meant death from general peritonitis much thought and time was spent on preoperative diagnosis. When it was demonstrated beyond doubt that by proper precautions the peritoneal cavity could be invaded with impunity preoperative diagnosis of gynecological, pelvic and abdominal conditions became less accurate and often were not made at all. It has been so easy to excuse our intellectual laziness in diagnosis by saying that it makes no difference since the correct diagnosis will be made after the abdomen is opened.

We all know this is false reasoning. In certain cases the diagnostic abdominal incision is directly contraindicated and may shorten the life of the patient, even if immediate death does not result. Poking around in the pelvic and abdominal cavities trying to make a diagnosis in a few moments when such diagnosis could have been made prior to operation by modern diagnostic methods is crude surgery and should be done away with.

The present paper was suggested by a recent case, rare to be sure, but easily diagnosticated had it been approached systematically and not hastily and carelessly. It is the same story with the other four cases which will be reported. In each the correct diagnosis could have been arrived at fairly easily, had the histories and physical signs been more carefully considered and analyzed.

*Case 1. Prolapse of right Fallopian tube through colpotomy incision mistaken for a granuloma. Removal of piece for diagnosis followed by severe hemorrhage.*

Mrs. H. J. A., aged 29, married, was operated upon in June, 1918, for a large pelvic abscess occupying principally the right side of the pelvis. The posterior culdesac was widely incised, the abscess emptied and the sac drained. The patient made a good recovery and gained thirty pounds in weight after leaving the hospital.

She was examined January 10, 1920, for local pain and tenderness. Since the previous operation she has never recovered her health. She tires easily and is unable to do her work.

Bimanual examination showed both appendages adherent and tender. The uterus was enlarged and fixed in the pelvis. At the site of the previous posterior colpotomy incision to the right of the median line could be felt an adherent irregular mass the size of the end of the little finger. Through the speculum the mass was seen to be irregular and reddish, like a coxcomb. The conclusion was that the mass was probably a granuloma at the site of the old colpotomy incision. In order to be more certain a small piece was snipped

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off with the scissors. A sharp hemorrhage followed which could only be checked by gauze packing. However, even with this evidence the tissue was thought to be granulomatous until the pathologist, Doctor C. V. Weller, reported the removed tissue to be a portion of the Fallopian tube.

January 28, 1920, the abdomen was opened and the microscopic diagnosis confirmed. The right ovary was bound down by adhesions in the posterior culdesac while a third of the fimbriated end of the tube projected through the vaginal wall and was adherent to the walls of the aperture. The right tube and ovary and the left tube were removed. The patient made a good recovery.

Here was a case in point. There was no reason why a clinical diagnosis should not have been made had greater care been taken in the examination. It is no excuse to say that owing to the situation of the prolapsed tube in the vault of a long and rigid vagina it was difficult to secure a good exposure of the prolapsed tube. It was the business of the examiner to overcome such difficulties. The bleeding subsequent to the removal of the section of the tube should have aroused suspicion that the tentative diagnosis of granuloma was probably incorrect. A granuloma when incised does not bleed as did the tube. Although the correct diagnosis was arrived at prior to operation, there was no intellectual satisfaction on the examiner's part connected with it because it was made by the pathologist.

The case also illustrates the peculiar trend of our minds when trying to arrive at diagnosis of unusual conditions. I knew this was an unusual case since I had never seen an adherent mass like this subsequent to a colpotomy although I have performed a good many hundred for purulent collections within the pelvis. Instead of carefully and systematically considering all the findings in this case whereby a correct diagnosis might and probably would have been arrived at, I jumped at conclusions and held to these conclusions until they were proved absolutely wrong by the microscopic examination.

The same thing will be found to be true in practically all the cases of errors in diagnosis which follow. The correct diagnosis could have been made in each instance if the facts in the examiner's possession had been carefully and systematically considered. As has been well said it is not lack of but a failure to use our knowledge that leads to mistakes in diagnosis.

So far as this particular case is concerned a fairly careful search of the literature fails to show a similar case reported. The nearest approach to it is prolapse of the appendages through rupture of the posterior vaginal wall. Cousins in an address on ovarian hernia and the protrusion of the appendages through rupture of the vaginal wall has thoroughly covered this subject and reports quite a few cases. The misplacements of the organs in his cases, are preceded by quite a different history. According to Breisky the rupture of the vaginal wall occurs almost exclusively in labor or during the puerperium. Grenser reports a case in which a pregnant woman suffering from ascites had a prolapse of the retroverted uterus and appendages through a tear in the posterior vaginal vault. Cousins reports a prolapse through a ruptured posterior vaginal wall of the ovary and tube in the case of an insane patient suffering from uterine prolapse due to persistent straining effort on the part of the patient who had suffered for some time from uterine and rectal prolapse.

It would seem at first glance as if prolapse of the ovary with the tube would be easier to diagnosticate than where the tube is prolapsed alone. However this is mere conjecture. The main thing to bear in mind is that prolapse of the appendages is possible after incision or rupture of the posterior vaginal wall.

#### MISPLACEMENT OF THE KIDNEY

There may be either a congenital or acquired misplacement of the kidney and in either condition the organ whether normal or diseased may lead to errors in diagnosis. This is well shown by a review of the literature where the kidney has been reported as mistaken for ovarian tumor, solid or cystic, fifteen times, cystic or solid tumors of the tube alone or with other organs fourteen times, solid or cystic ovarian growths with the possibility of other organs beside the kidney being involved six times and hematometra five times.

The following case illustrates how easily hydronephrosis may be mistaken for an ovarian cyst.

*Case 2.—Cystic kidney situated in the median line, apparently arising from the pelvis mistaken for an ovarian cyst.*

Mrs. S., aged sixty-four, widow, was admitted to the hospital November 18, 1903. The menopause had been established sixteen years. She has always been in fair health up to the beginning of the present trouble. Three months ago she was told she had a tumor, although she thinks her trouble started a year ago with pain in the right side and lumbar region. At times she is sick at the stomach and has pressure symptoms and pain at stool.

Examination showed an extremely thin woman with marked atheromatous arteries. The abdomen is regularly distended by a mass which reaches from the pubes to the epigastrium. The tumor is slightly more prominent on the right than the left side. On the right it reaches to the anterior superior spine and extends upward to the border of the ribs, on the left it is within two fingerbreadths of the anterior superior spine and almost to the border of the ribs. The umbilicus protrudes. The growth is smooth, elastic in feel, and apparently is cystic. The percussion note is flat on the right but somewhat tympanitic on the left side. By vaginal examination the tip of the finger just reaches the growth at the brim of the pelvis. The uterus is atrophic, the appendages not made out.

The diagnosis was cystadenoma of the right ovary and the patient was operated upon November 19, 1903. On opening the peritoneum a blue walled cystic tumor presented. The peritoneum was in front of the tumor, the cecum to the left and overlapping the growth. The cystic mass was found to arise from the right flank and was unconnected with the pelvis. The left kidney was palpated and found to be normal in size and position. The peritoneum was incised and the cystic kidney removed. The patient made a good recovery.

Here again were all the facts for making a correct diagnosis had they been put together in the proper manner. There was a distinct history of pain in the right side and flank, unusual, to say the least, with cystadenomata. Moreover, it was exasperating to have dictated the finding that there was decided tympany over the left side of the tumor yet to have made no use of such data because the conclusion was jumped at that one was dealing with the very common cystadenoma.

A history of pain in the flank must always be regarded as indicative of the renal origin of cystic neoplasms until the contrary has been proved. To-



day it is the surgeon's duty to make a preoperative diagnosis in every cystic abdominal or pelvic growth. If there be a distinct history of the pelvic origin of the growth and if the abdominal and pelvic findings confirm the diagnosis of an ovarian cystadenoma, it may be unnecessary to make use of other methods of examination in the differential diagnosis. In all doubtful cases, however, it is absolutely essential in the interests of good surgery to employ all urological methods to establish the diagnosis.

The cystoscope may reveal no urine coming from the ureteral orifice on the suspected side or it may show the urinary flow to be continuous in contrast with an intermittent flow from the other orifice thus denoting hydronephrosis with or without intermittent hydronephrosis.

In doubtful cases it is essential to employ the functional tests after ureteral catheterization in order to determine the integrity of each kidney. The same may be said as to the value of pyelography in difficult or obscure cases.

A review of the literature shows that in the large majority of cases where cystic kidneys were mistaken for ovarian cysts, the preoperative diagnoses could have been made had the examiners given more consideration to the possibility of the growths being renal in origin.

Curiously enough, notwithstanding the lesson learned from the above case which I spoke of many times in my clinics when the differential diagnosis of ovarian cysts was under discussion, one of my former assistants, Doctor Ward F. Seeley, during my absence made the same error in diagnosis as follows.

*Case 3.—Enormous cystic left kidney reaching from the pubes to the ensiform mistaken for an ovarian cyst.*

Mrs. G. L., aged forty-seven, entered the University Hospital, February 10, 1915, complaining of enlargement of the abdomen of four years' standing. Four years ago she discovered a firm solid mass, the size of a grapefruit in the lower left abdominal quadrant. During the four years there has been a gradual increase in the size of the abdomen but no symptoms aside from the inconvenience of the enlarging abdomen. There were no fever, chills, nausea, vomiting or jaundice. The general health was excellent.

Examination showed the patient of moderate frame and good nutrition with an abdomen enlarged especially in the lower left quadrant. The highest point of the swelling is three inches below and to the left of the umbilicus. Palpation shows the tumor apparently arising from the pelvis and filling the left lower abdominal quadrant. It reaches almost to the ensiform and extends well into the right upper and lower quadrants. The mass is freely movable and easily displaced to the right side of the abdomen. The smaller upper pole of the mass is firm and hard, the larger lower pole is distinctly cystic. The tumor is easily palpable through the posterior culdesac and gives a distinctly cystic feel to the examining finger.

The diagnosis of multilocular ovarian cyst was made and the patient operated upon February 16, 1915. At operation the uterus was found displaced backward by a cystic tumor which extended from the pelvis to the ensiform. Both ovaries were normal. The colon was stretched over this mass which was retroperitoneal and arose from the left kidney. The right kidney was palpated and found normal. The cystic kidney was aspirated and 2200 c.c. of fluid removed. The kidney was removed in the usual manner and the patient made a good recovery.

This case was quite similar to the other case of hydronephrosis except the disease was of longer duration and the cystic destruction of the kidney much greater. It shows how easy it is to be mistaken in the origin of a cystic mass a part of which lies in and can be palpated in the pelvis. It also illustrates how important it is to outline carefully the uterus and appendages as an aid to diagnosis. Rectal examination is often very valuable in such cases and should always be used in the presence of cystic growths no matter how simple the diagnosis may appear.

The history of a round mass in the left lower quadrant four years before entrance to the hospital should have aroused suspicion that the origin of the growth might be elsewhere than in the ovary. At times the patient may be mistaken regarding the time of appearance or the early location of the growth but usually such testimony is valuable since if the patient is intelligent enough to notice a growth she is apt to have fairly accurate information regarding it. At least her story should be given credence until proved by other findings to be inaccurate. More often it is the examiner's fault in that he approaches the case with preconceived ideas of the diagnosis based upon findings pointing to a common disease leading to a scant consideration of points in the history which may be all important.

Aside from a cystic kidney which may be mistaken for an ovarian cyst, the movable or floating kidney or the congenital pelvic kidney may give rise to errors in diagnosis. Movable kidney is met with so frequently in women that the examiner is almost always on the lookout for it, therefore, recognizes the condition by the usual signs. In rather exceptional cases where the movable kidney lies within the pelvis it may give rise to confusion until doubt is solved by replacement into its position in the flank.

Movable kidney with torsion may be hard to distinguish from an ovarian cystic or solid tumor with a twisted pedicle. The pain, however, when the pedicle of a movable kidney is twisted is located in the renal or epigastric region, while the pain of a twisted pedicled cyst is lower down and there is more general peritoneal involvement.

In case of doubt it is easy to settle definitely whether the tumor be renal by ureteral catheterization or the x-ray.

The congenital pelvic kidney being more uncommon and immovable as a rule is more apt to be either overlooked or mistaken for a genital tumor. The following case illustrates such an error.

*Case 4.—Pelvic kidney in a woman without a vagina mistaken for hematometra and punctured through an incision made between bladder and rectum.*

Miss M. Z., aged seventeen, single, was examined June 23, 1911. The patient has always been healthy with the exception of never having menstruated. There has never been anything suggestive of menstruation, either a discharge of blood from the vagina or menstrual molimina, until Christmas, 1911, when she had a spell during which she felt very nervous, blue, and very irritable. Although she had no particular pain she was obliged to go to bed for three weeks. There have been a number of similar attacks since during which there has been a dull ache in the lower abdomen but no sharp pain.

Examination showed a well-developed and well-nourished girl, perfectly normal so far as the breasts, pubic hair, and feminine characteristics were

concerned. The clitoris and labia were normal but there were no signs of an introitus. The meatus urinarius admitted the tip of the little finger with ease and there was some eversion of the mucous membrane. Rectal examination failed to reveal with distinctness either uterus or appendages but did show a globular mass just at the end of the examining finger.

The conclusion was at once arrived at that the condition was one of hematometra and on June 27, the tissue between the rectum and bladder was dissected upward for a distance of three inches through a transverse incision. At this distance the mass could be distinctly made out and with the idea of emptying the uterus of blood and establishing a communication with the outside a scalpel was thrust upwards into the mass. The result was not as expected for upon withdrawing the scalpel there was a terrific hemorrhage, the bright red blood differing greatly from retained menstrual fluid. The hemorrhage was so sharp that it could only be stopped by tight gauze packing. The diagnosis now was plain, absence of vagina and uterus together with a pelvic kidney. For a number of days samples of the urine showed large amounts of blood which gradually diminished. On July 5, an artificial vagina was formed by means of flaps taken from the labia and buttocks. The patient married soon afterward and the vagina was found serviceable.

At the risk of being tiresome, it is again pointed out that the error in diagnosis was due to the same causes which led to the mistakes in the three previous cases. So sure was I that I was dealing with retained menstrual blood that I proceeded to empty the uterus in a manner which might have led to fatal results. There is very little satisfaction in having the diagnosis in a case like this thrust into your face. To be sure the woman did not die from the hemorrhage, but this was due to no foresight on my part.

All this could have been avoided by raising the query as to whether the pelvic tumor might not be renal in origin and determining the exact position of the kidney or kidneys by modern methods.

Cullen reports an almost similar case of a right pelvic kidney, absence of the left kidney, absence of vagina and uterus and both ovaries in the inguinal canals. The diagnosis of hematometra was made and the tissues between bladder and rectum dissected for a distance of five inches. Then doubt was thrown upon the diagnosis and the abdomen was opened showing the true condition of affairs.

Engstroem made a diagnosis of hematometra in a young girl of seventeen who lacked vagina and uterus. Laparotomy showed a pelvic kidney and the operation was completed by removal of both adnexa, an unjustifiable procedure in the light of our present day knowledge.

Von Kubinyi reports the case of a girl of nineteen who had never menstruated. Rectal examination showed the presence of a round tumor thought to be a hematometra. The tissue between the bladder and anus was dissected up to the peritoneum. As the tumor could not be reached from below the abdomen was opened and the tumor found to be a saeral kidney.

Buss removed a pelvic tumor from a girl of twenty-one who showed absence of vagina and had suffered from colicky pains, the original diagnosis having been hematometra. The patient died in seven days from uremia and microscopic examination of the removed tumor showed it to be a kidney. The other kidney was not found at the autopsy.



Other cases have been reported of death following the removal of pelvic kidneys showing the danger of such procedures as congenital anomalies are liable to be multiple. In the light of our present knowledge suspicion should at once be aroused as to the renal nature of any mass in the pelvis where absence of the vagina, in whole or part, exists. Again it may be stated that it is an absolute necessity to obtain complete information regarding the genitourinary apparatus before any operation is attempted.

#### MISPLACEMENT OF THE SPLEEN

The so-called wandering spleen has given rise to more errors in gynecologic diagnosis than has the movable or pelvic kidney. A partial review of the literature shows that wandering spleen has been mistaken for an ovarian tumor, cystic or solid, thirty-five times; ovarian tumor or some other genital organ, six times; uterine tumor, seven times, with other scattering mistakes in diagnosis.

The diagnosis of wandering spleen may be easy or exceedingly difficult dependent upon the size of the woman afflicted, the position of the spleen, and whether it be movable or fixed by adhesions. The difficulty of diagnosis is illustrated by the following case where the diagnosis was not made until after operation.

*Case 5.—Wandering spleen adherent in the pelvis and resting upon the retroverted uterus, mistaken for a uterine fibroid. Removal and recovery.*

Mrs. E. W., aged thirty-nine, married, was admitted to the University Hospital November 8, 1901. The patient was very obese, weighing in the neighborhood of 300 pounds. Her present trouble dated from the age of nineteen when she had a severe fall. For months she was unable to walk and suffered from severe pain in the lower abdomen. The attacks seemed to have no connection with the menstrual periods. Abdominal and pelvic examinations were extremely difficult on account of the obesity of the patient. However, a pelvic mass, more solid than cystic, could be indistinctly made out in the lower abdomen rather more to the right than the left. The mass was quite tender and rested upon the retroverted uterus. A diagnosis was made of probable uterine fibroid and to save the obese patient a laparotomy, if possible, the anterior culdesac was opened. A large adherent mass could be felt just at the tip of the finger, resting upon the retroverted uterus. Its size preventing removal through the vagina, the abdomen was opened by an incision reaching from the pubes to the umbilicus. The tumor was found to be a displaced spleen adherent to the vesicoparietal peritoneum with its lower surface resting upon the retroverted uterus. The pedicle was ligated and the spleen removed. The patient made a good recovery and showed no ill effects from the removal of the organ, her symptoms being entirely relieved.

Displacement of the spleen is not uncommon in women, especially married women during middle life. If the spleen be displaced but nonadherent the diagnosis is not especially difficult if one keeps in mind the possibility that the spleen, like the kidney, may be movable. When it has been displaced and is adherent in the pelvis or at the pelvic brim the diagnosis may be extremely difficult, as in the case just reported, where it was thought to be a uterine fibroid. I have removed solid fibroid tumors of the ovary shaped

not unlike a spleen with a notch in the middle of the growth. It is not always easy to palpate the splenic notch in wandering spleen since the organ as it descends from its normal position tends to become horizontal and the notch to be drawn backward and upward. These facts, together with the increase in size of the spleen due to edema and congestion, can give rise to frequent errors of diagnosis so far as palpation is concerned.

Unless the peritoneal surface of an ovarian cyst or pedunculated uterine fibroid is or has been the seat of infection, there will be no tenderness on palpation, in contradistinction to the prolapsed spleen which, without torsion of the pedicle or evidence of peritoneal inflammation, is quite sensitive on palpation.

A study of the reported cases of wandering spleen shows that the condition cannot be excluded because a mass lies to the right of the median line. On the contrary, such a spleen can occupy any position in the abdomen or pelvis in which a tumor of the right or left ovary may be found.

Where the pedicle of the spleen has become twisted the difficulties of diagnosis become increased since the pain and sensitiveness may be the same in degree and location as when the pedicles of tumors of the genital organs become twisted. As in the case of cystic and solid tumors of the kidney the history may be of the greatest value in the differential diagnosis of wandering spleen. A history of a fall or injury and the slow gradual descent of a mass from under the left ribs should always arouse suspicion as to the possibility of a tumor being a wandering spleen.

It appears as if the new method of abdominal diagnosis, pneumoperitoneum, where the outlines of the abdominal and pelvic organs are shown by the x-ray after the injection into the peritoneal cavity of nitrous oxide or carbon dioxide gas, holds out the greatest possibilities regarding the diagnosis of wandering spleen. If this method of diagnosis, after its technic has been perfected, fails to show the spleen in its normal position, but shows a tumor elsewhere, it is strong evidence that the tumor is splenic no matter what the position or whether it be adherent or free.

Other misplaced abdominal organs have led to errors of gynecologic diagnosis. For instance, Chadwick reports a most interesting case where a prolapsed stomach was aspirated through the posterior culdesac under the impression that a pelvic abscess was being emptied. In two instances the enlarged and prolapsed liver has been mistaken for an ovarian cyst, while the prolapsed enlarged gallbladder has been incorrectly diagnosticated as ovarian cyst in at least five cases. However, such errors of diagnosis will be merely referred to since I have no personal cases to record.

#### CONCLUSIONS

1. Mistakes in gynecologic diagnosis arising from misplaced organs are not uncommon as shown by the literature in which only a small proportion of such mistakes is probably recorded.

2. Such errors in diagnosis arise from either carelessness, or preconceived ideas of diagnosis whereby important facts in the history and equally important physical findings are either overlooked or ignored.

3. Such diagnostic errors can be averted by greater care in systematically considering with a free mind the facts in the case relating to the history and physical findings provided the latter are obtained through the employment of the most modern methods of examination.

4. In every case a preoperative diagnosis should be made and recorded in order to profit by mistakes revealed at the operation or autopsy.

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(For discussion, see p. 211.)



## THE TREATMENT OF PREGNANCY AND LABOR COMPLICATED BY CARDIAC DISEASE\*

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SO far as can be determined from statistics, approximately 2 per cent of all obstetric cases are complicated by definite valvular disease of the heart, more or less serious in degree, which renders the prognosis somewhat doubtful, either in the immediate pregnancy or in the years to come. When the patients who are suffering from myocardial change, whether acute, following some recent infectious process, or chronic, are included, it seems fair to assume that about 3 per cent of all parturient women have a cardiac condition which may be expected to react more or less seriously to the strain which pregnancy and labor impose on the heart. There is probably no obstetric complication which calls for greater judgment on the part of the attendant than do cardiac lesions, since not only the immediate prognosis for mother and child, but the future health of the mother depends on the proper conduct of pregnancy and labor.

The obstetrician is not infrequently called on to decide whether the risks of pregnancy and labor are too great to be undertaken by a patient who is known to have a heart lesion or whether pregnancy may be undertaken with a reasonable chance for an immediately successful outcome for both mother and child, and without serious danger that the mother may be left a cardiac invalid at an early date. More commonly, however, he is consulted when the pregnancy is already an established fact and the question to be answered then is whether the pregnancy must be terminated at an early date for the sake of saving the life or health of the mother or be allowed to continue, in the absence of serious symptoms, to, or nearly to, full term. If he decides, after due consideration, that it is unwise to allow the pregnancy to go on, the method to be adopted for the termination of pregnancy has an important bearing on the future life and health of the patient. In the cases where the continuation of pregnancy seems justifiable, the care given the patient during pregnancy and the method of delivery at term have an important bearing not only on the immediate life of the patient, but also on her future. The decision of the obstetrician in the individual case is evidently, therefore, not a simple matter, since an error of judgment may involve the loss of the maternal life or health, or result in forbidding childbearing needlessly to a woman who would gladly run some risks for the sake of having a child, if there is any method of treatment by which the risks can be so minimized as to be justifiable.

The cardiac patient who attempts pregnancy must be considered as a relatively unfavorable risk, even under the best conditions. Cardiac damage is inevitable, since the cardiac reserve will be depleted to some extent by the additional strain imposed on the heart, and the pregnancy must be so con-

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ducted as to give the best chance for a favorable result for both patients, while delivery must be so accomplished as to impose the least possible strain on the damaged heart. It is not enough for the obstetrician to take into account a successful result in the immediate pregnancy, but he must bear in mind the fact that the strain of pregnancy is a serious one and that his patient's future health depends largely on the care which she receives. He must, therefore, take into consideration the effect which the strain of pregnancy and labor will have on the damaged heart in the years to come as well as at the present time, and so conduct the case that the cardiac reserve shall be depleted to the least possible extent.

Before considering the methods to be adopted in the care of the individual case certain facts must be accepted as true if the patient is to be given the best chance for a favorable result. First, no matter what the nature of the cardiac lesion in the given case, the increased strain which pregnancy and labor unavoidably impose on the damaged heart must diminish to a certain extent the cardiac reserve and thus to a greater or less degree shorten the patient's life. The damage may be such as to result in death or chronic invalidism unless the pregnancy is terminated early and the child sacrificed, or it may be slight in degree and only become evident as the patient grows older. But in my opinion every patient with a cardiac lesion who attempts childbearing must pay some price in length of days for each child, the exact amount being dependent on the nature of the cardiac lesion, the condition of the heart muscle at the beginning of pregnancy and the success with which the heart is protected from all unnecessary strain during pregnancy and at the time of labor.

Second, it is impossible to estimate accurately the extent of the damage which will result to the heart from the strain of pregnancy, even under the best conditions, in spite of the most careful consideration of all the factors present in the individual case. My experience has shown that in two patients with an apparently equal degree of cardiac damage, which seems to be perfectly compensated under normal conditions, one will develop more or less serious symptoms during pregnancy and labor, while the other will pass through the strain without developing any unfavorable symptoms. I believe that there are no accurate means of determining the effect of the pregnancy on the heart and it is exceedingly difficult to formulate an accurate prognosis for the given case. I can recall several instances in which the results, both good and bad, have proved so widely at variance with the opinions expressed by competent internists after careful study of the patient that I am convinced that the only fair prognosis which can be given to a cardiac patient is that more or less damage to the heart will result from the attempt to have children, and that her life will be shortened to some extent, but that the actual degree of damage in the individual case cannot be estimated in advance. There are, of course, certain patients in whom the cardiac history, taken in conjunction with the physical findings, is such that it is evident that childbearing will either prove fatal or leave the patient a chronic invalid, and in these cases pregnancy should either be forbidden, if the obstetrician

is consulted in advance, or should be interfered with promptly as soon as the facts are clearly appreciated. In the majority of cases, however, a patient—if otherwise in good health, without a history of previous decompensation and whose heart muscle is presumably sound—can be advised that in all probability pregnancy can be undertaken, under proper supervision, with an excellent chance of an immediately successful result, but that the strain on the heart will cause some damage which will ultimately shorten her life, though to what extent it is impossible to predict accurately. Therefore, it is a question for the patient to decide herself, whether she is willing to pay an indefinite price for the sake of having children, the exact amount being largely determined by the care with which pregnancy and labor are conducted. There is always, however, an element of uncertainty, and relatively favorable cases, even under competent supervision, sometimes go badly.

It has been a long established tradition of the medical profession that if a patient with a cardiac lesion consults her physician as to the advisability of pregnancy, she should be strongly cautioned against it. If the only problem to be determined in the given case were the prolongation of the patient's life to the utmost extent this advice would be sound, since there can be no question but that the avoidance of all possible strain on the heart will do more to conserve its reserve than any other method of treatment. There are, however, many women with cardiac lesions who feel that life is incomplete unless they have children, and who, while not willing to sacrifice their life or immediate health to gratify this desire, are perfectly willing to shorten their lives to a greater or less extent. In advising these cases as to the justifiability of attempting pregnancy, the judgment of the obstetrician is often taxed to the utmost. The nature of the lesion, the history of the patient as regards symptoms of previous decompensation, the probable condition of the heart muscle, and the care which the patient is able and willing to receive, both during pregnancy and at the time of labor, must all receive due consideration before proper advice can be given to the individual patient.

Experience has shown that certain lesions are more seriously affected by pregnancy than others. Of these, mitral stenosis, either alone or in combination with other lesions, is distinctly the most serious. The aortic lesions come next in order, and mitral regurgitation, while not entirely negligible, is of relatively minor importance. If myocarditis can be demonstrated, the seriousness of the prognosis is definitely increased. If a patient has never had any signs of decompensation either in her ordinary life or in previous pregnancies and has suffered no limitation of her ordinary activities on account of the cardiac lesion, the outlook for a successful pregnancy with a minimum of damage is good. If, however, there have been previous attacks of decompensation, or if the patient develops symptoms referable to the heart on what would be ordinary exertion for the healthy woman, the prognosis is to say the least doubtful, and pregnancy should be advised against, irrespective of the nature of the lesion. If a patient's circumstances are such, other conditions being satisfactory, that she can take proper care of herself during pregnancy in order to minimize the damage to the heart and can command such



obstetrical skill at the time of labor as to save the heart from undue strain, pregnancy is often justifiable, whereas if the opposite were the case, pregnancy should be absolutely forbidden. Furthermore each patient must be informed that if cardiac symptoms unexpectedly arise during pregnancy in spite of careful supervision, a prompt termination of the pregnancy will probably be necessary, even in apparently favorable cases, and that under such circumstances a sufficient degree of cardiac damage may result to render her a cardiac invalid to a greater or less extent, even though the pregnancy be ended in the early months. Under these conditions it is fair to advise a cardiac patient that it is justifiable for her to attempt childbearing, but otherwise it should be absolutely forbidden.

In most cases, however, pregnancy is already a fact when the patient consults her physician for care, and the problems which he has to decide are first whether a continuance of the pregnancy is justifiable, and if not, by what means is it best terminated; second, if continuance of the pregnancy seems wise, what routine shall the patient adopt to minimize the strain of pregnancy on the heart; and third, how shall she best be delivered if pregnancy is successfully accomplished.

The question as to whether the pregnancy should be allowed to continue or must be terminated promptly depends on several factors. Some authorities go so far as to say that the discovery of a mitral stenosis is sufficient indication for immediate abortion, while others feel that heart disease is not a contra-indication for pregnancy and labor. Neither position is correct as is evidenced by the fact that many patients with a marked mitral stenosis or an aortic lesion go through pregnancy with little apparent damage and regain their ordinary health after delivery, while on the other hand in a certain proportion of cases cardiac decompensation develops, which sometimes results in death or invalidism even though a patient is given the best possible care. It is evident, therefore, that the problem is one which must be settled for each individual patient, and no rule can be laid down.

If a patient with mitral stenosis or aortic disease has never had symptoms referable to the heart (at least of a severe character), and the heart is performing its work properly when the patient applies for advice, such a patient should be placed on a definite routine, the purpose of which is to remove all possible strain from the heart, and the pregnancy should be allowed to go on under close observation, interference being only advisable in case symptoms develop. This is particularly true in patients who have had the cardiac lesion for a considerable period of time and have suffered no disability from it. If, however, the patient when under proper supervision has suffered attacks of decompensation, if when she applies for care the heart is already causing symptoms, or if her normal activities have in the past been seriously hampered on account of the heart, a patient should be advised that it is unwise to allow the pregnancy to go on, since a serious failure of compensation may develop at any time with possibly fatal results.

If abortion seems advisable the method of operation is of considerable importance. It seems to me that a termination of the pregnancy is only a partial

operation in these cases since it leaves the patient in a condition to again become pregnant with the necessity of future abortions, and, therefore, I believe that unless the patient's condition is such as to contraindicate an abdominal operation the abortion is best accomplished by abdominal hysterotomy. Sterilization should be performed at the same time to obviate the danger of future abortions, since the necessity of terminating one pregnancy for cardiac reasons should be considered as an absolute contraindication to future pregnancies.

I believe it is little, if any, more dangerous for a patient with a bad heart to be delivered in this way than to have the uterus emptied from below, and the advantage to the patient of being permanently protected against pregnancy, which is considered a serious menace to her life, is considerable. If the patient is suffering from an attack of decompensation at the time when abortion is decided on, every effort should be made to restore compensation before the uterus is emptied. If compensation can be restored, the obstetrician has a choice of several methods for emptying the uterus, but I believe that the abdominal route under general anesthesia is the preferable method, irrespective of the period of pregnancy. If, however, it proves impossible to restore satisfactory compensation, there is no question in my mind but that delivery by abdominal hysterotomy, under local anesthesia, preceded by morphine and scopolamine is the most satisfactory method. Such patients are poor risks for any of the general anesthetics and will occasionally die as the result of their use. Paravertebral anesthesia has in my hands proved a very exhausting method to such a patient, although it produces satisfactory anesthesia, and I should hesitate to employ spinal anesthesia on a patient with a decompensated heart on account of the marked changes in blood pressure which accompany it, though this feeling may not be based on sufficient grounds.

The results which I have had in Cesarean section at term and earlier with local anesthesia, preceded by morphine-scopolamine, have convinced me that this is the most satisfactory method for use in patients whose cardiac condition contraindicates a general anesthetic, and the operation is as easily performed on a patient three or four months' pregnant as at term, being completed by sterilization. The patient is thus delivered and protected against the dangers of future pregnancies at a single operation.

The employment of the morphine-scopolamine preliminary to operation under local anesthesia, has, in my experience, proved most satisfactory, the patient not infrequently having no recollection of the operation. In preparation for the operation the patient is given gr.  $\frac{1}{6}$  of morphine and  $\frac{1}{200}$  gr. of scopolamine two hours before the time set for operation, the scopolamine being repeated two or three times at thirty to forty minute intervals until the patient is asleep. The patient's eyes are covered and her ears plugged with cotton before she is brought to the operating room. No unnecessary noise is permitted in the operating room. The abdominal wall is injected with one half per cent novocain, it being only necessary to prepare the skin and fascia. Neither the parietal nor visceral peritoneum requires treatment. An interval of at least ten minutes should elapse between the injection of the novocain and the beginning of the operation. If sterilization is to be performed

the uterine portion of the broad ligaments should be anesthetized before the tubes are excised from the uterine cornua. I have found that by strict attention to detail cardiac patients who are often excessively nervous and hard to control can be brought to operation in a perfectly quiescent state and commonly have no recollection of the operation.

If it is decided that the patient is a fair risk for pregnancy, the pregnancy should be allowed to go on under close supervision. All possible strain should be avoided; active exercise, especially hill climbing and going up the stairs, should be eliminated so far as possible. The general hygiene, fresh air, diet, etc. should be carefully regulated. The bowels should be regulated. The urine should be examined at weekly intervals so that any signs of passive congestion may be discovered early. The patient should be instructed to take a two-hour rest in bed every day, and to supplement this by spending one day a week in bed during the early part of pregnancy and two days a week during the last three months. The blood pressure should be carefully followed, and a rise in blood pressure should cause grave concern on account of the extra burden thrown on the heart, and may be sufficient to warrant an abortion. Digitalis or other cardiac stimulants are to be used if any signs of failing compensation occur. Digitalis may be employed to advantage in all cases in the last months of pregnancy and the rest periods may be extended if desirable.

If patients are thus kept under close supervision, any signs of cardiac distress will be discovered early and can be met by increased precautions in the majority of instances. If, however, the cardiac symptoms do not subside promptly, and especially if they show any signs of increase, immediate termination of the pregnancy is called for to limit the cardiac damage. This rule should be an absolute one if the pregnancy is less than six months' duration, since the attempt to prolong the pregnancy for several months in the hope of obtaining a living child in a patient whose cardiac condition is showing signs of failure under proper care is almost sure to result disastrously and is not justifiable. In patients six months' or more advanced in pregnancy in whom the cardiac symptoms, though definite, are not alarming, an attempt may be made to carry along the pregnancy to viability if a sufficiently high value is placed on the child by the mother, so that she is willing to run the risk of serious invalidism for the sake of a living child. The patient must, in these cases, be practically confined to her bed throughout the remainder of the pregnancy, and cardiac stimulants should be used as indicated. Delivery should be accomplished by Cesarean section under general or local anesthesia as soon as the child is believed to be sufficiently developed to live, in order to minimize the cardiac damages as far as possible, local anesthesia being the choice, if the cardiac symptoms are at all marked, and sterilization to avoid future pregnancies is advisable. Interference is seldom indicated in such cases before the 36th week, unless urgently demanded by the cardiac condition, since so much has already been sacrificed by the mother for the sake of the child that its chances should be guaranteed as far as possible. It must not be forgotten that if the mother suffers from severe decompensation the child frequently dies as a result. Therefore, if the cardiac symptoms appear threatening, it is seldom



or never justifiable to attempt to prolong the pregnancy for a problematical advantage to the child.

As a general rule in these cases I believe that the abdominal route should be selected, irrespective of the time when interference is advised, and that the patient should be sterilized to prevent the possibility of future pregnancies. The choice as to whether the operation should be done under a general or a local anesthetic depends on the degree to which compensation can be restored before the operation is performed, but operation under local anesthesia may well be applied to all cardiac cases who have developed any signs of decompensation.

The strain on the heart increases in all as the end of pregnancy approaches, and if we can spare the heart two weeks or more of this increasing burden the prognosis for the patient's future will be better than if she is allowed to go to full term. Moreover in any cardiac condition which has given rise to symptoms, even though compensation has been completely restored, this strain should be lessened so far as the interests of the child permit. In all cases in which a definite decompensation has developed during pregnancy it should be recognized that future pregnancies are absolutely contraindicated, and that the possibility of chronic invalidism in the near future is a definite one at the best, even in the absence of all avoidable strain. Should pregnancy occur again in such cases the danger to life and health is greatly increased and prompt abortion is indicated. For this reason sterilization is advisable.

The pregnancy should be ended by the method which will throw the least possible strain on the heart, which is, in my opinion, Cesarean section, under general or local anesthesia, according to the condition of the heart when operation is considered advisable, and the preferences of the individual operator. I believe firmly that by this method of treatment the damage can be limited as far as is possible by any method, but any failure of compensation during pregnancy means that considerable harm has been done, even though compensation may have been restored by treatment, and that the patient's future is doubtful at the best. The more serious the decompensation the worse the outlook for the patient, and the earlier will she become a cardiac invalid.

Such patients must be advised that pregnancy should be under no circumstances again attempted, and sterilization at the time of the present delivery should be strongly advised, since by this method only can the possibility of pregnancy be absolutely precluded. In the cases in whom abortion is indicated in case conception occurs at a later date no chances should be taken.

If the patient goes through the pregnancy without developing any signs of decompensation, the method of delivery is of great importance and will vary in the individual patients with the nature of the heart lesion, the number of the pregnancy, and the estimated difficulty of labor. In primiparæ with mitral stenosis, or with an aortic lesion, delivery should, in my opinion, be accomplished by Cesarean section, preferably about two weeks before the estimated date of labor so as to spare the heart the increasing strain of the last weeks of pregnancy. There is no doubt that in the majority of cases a carefully guarded labor ended by an operative pelvic delivery as soon as the cervix is fully dilated

will give immediately satisfactory results, but the strain of labor on the damaged heart will to some extent deplete its reserve and the future prognosis will be improved if the strain of labor is avoided. In these cases there is no reason for sterilizing the patient unless she requests it, owing to the fact that if she is willing to pay a certain price for one or more other children her experience during this pregnancy warrants her in undertaking the risk. In multiparæ who have had no signs of decompensation during pregnancy or at any other time I believe that a short, first stage labor, delivery to be accomplished by forceps or version as soon as the cervix ceases to be an obstacle, will give nearly as good results, but the length of labor in primiparæ, especially if examination gives any reason to suppose that the labor will be at all a difficult one, will throw such strain on the heart as to render an abdominal delivery the wisest course and ultimately result in unnecessarily shortening the patient's life. It is not a question in my mind of the immediate result, but of conserving the cardiac reserve so as to lessen the possibility of the patient's becoming a cardiac invalid in the years to come.

In patients with mitral regurgitation which has never caused any symptoms, I believe that the only precaution necessary is to avoid the strain of the second stage of labor by prompt delivery as soon as the cervix is fully dilated.

The same principles should be followed in patients who are believed to have myocardial change, although no definite heart lesion can be demonstrated. The condition of the heart muscle is even more important than the question of a valvular lesion, and in patients who are suffering from symptoms suggestive of myocarditis, whether acute or chronic, all possible strain should be taken off the heart. This is best accomplished by abdominal delivery at a fixed date, thus avoiding the strain which labor imposes on the heart.

I recognize that this method of treating cardiac patients may be criticized; that it may be said with truth that statistics do not warrant the assumption that young women with cardiac lesions are in so precarious a condition as to warrant such radical methods of treatment. The results obtained in any lying-in hospital, as shown by the records, will apparently prove that the great majority of patients with definite cardiac lesions will pass through pregnancy and labor without serious symptoms, and that it is only in the occasional primipara or in the woman who has had repeated pregnancies, perhaps against advice, that immediately serious results occur. I believe, however, that this is a case in which the hospital records only tell a part of the story. It is recognized that some patients with cardiac lesions, previously apparently in good health, either die during pregnancy and labor, or are left as cardiac invalids as a result of the strain. In my opinion it is impossible to predict accurately which patients will do well and which will suffer severely as the result of pregnancy. Furthermore the follow-up system of our lying-in hospitals has not been sufficiently developed to tell us what the future of these patients may be. I have seen a sufficient number of patients who have passed through one or more pregnancies without serious disaster only to become permanently invalidated within a few years, to be absolutely convinced that it is part of the duty of the obstetrician to safeguard his patient's future by every means in his power.

I feel therefore that the line of treatment which I have attempted to outline in this paper will do more to safeguard the future health of a patient and at the same time allow her the joy of one or more children than any other method of treatment, though, of course, I will admit that the most conservative of all methods of treatment is to forbid pregnancy to every woman who has a cardiac lesion, and to advise abortion if pregnancy occurs.

443 BEACON STREET.



## THE USE OF BLOOD TRANSFUSION IN OBSTETRICS AND GYNECOLOGY\*

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BY the use of modern procedures, blood transfusion has come to be a valuable asset in our accepted methods of treatment. Its importance has now been established beyond controversy. It is particularly valuable in the treatment of hemorrhages, shock due to hemorrhage, secondary anemia, and certain blood dyscrasias.

Pemberton,<sup>1</sup> in the introductory sentences to an excellent history of transfusion, says: "The history of the development of the operation of transfusion of blood is an interesting record of alternate triumph and failure. History is replete with evidence that from early time man's imagination has been stirred by the possibility of restoring health, vigor, and even youth to the aged and infirm by replacing blood of young and healthy." Physicians for several generations have been interested in this topic, but in our present-day conception, it is only of value to restore health.

In this article there is also described an apparatus for transfusion used by Blundell in England in 1818, which consisted of a syringe, two-way stopcock and receptacle. The principle is the same as used for our transfusions. Seven of Blundell's transfusions were performed on women suffering from loss of blood due to childbirth. Of these three were successful.

That obstetricians realized the value of transfusion is attested by the fact that Braxton Hicks<sup>2</sup> reported six cases in 1869. These were done during pregnancy or parturition, but unfortunately all died. He suggested phosphate of soda as an anticoagulant and gave directions for its use. Losee,<sup>3</sup> in 1919, again showed the value of this procedure in obstetric work.

In transfusion there are two general principles: First, the giving of unaltered blood, and second, the use of blood so altered by sodium citrate that it will not coagulate.

As to the relative value of unaltered or citrated blood, the opinions of various writers are of interest. Unger<sup>4</sup> believes that one of the differences between unmodified and citrated blood is manifested by more frequent occurrence of reactions with the latter method. He writes: "For diseases in which blood is indicated for itself, that is, when it is required as a tissue, as in the various anemias, especially when the disease is hemolytic in nature, there can be no question as to the relative merits of unmodified blood which runs almost from vessel to vessel and that which has been handled, chemically altered and allowed to remain for an indefinite time outside the body. The transfusion of unmodified blood is the procedure of choice."

Garbat,<sup>5</sup> on the other hand, concludes a paper on blood transfusion as follows: "One hundred transfusions by the citrate method have been per-

\*Read at a meeting of the New York Obstetrical Society, April 13th, 1920.

formed for various disturbances and the favorable results compare almost absolutely with those attained by other authors using unmixed blood. It should, therefore, except only in special instances, be adopted as the routine method, since both the clinical and the laboratory findings support this view."

Pemberton,<sup>6</sup> while not comparing the two, writes, in discussing transfusion for bleeding: "It is of interest that, clinically, the use of an anticoagulant in the transfused blood not only does not retard the coagulability of the recipient, but possesses an equal power of hemostasis with the undiluted blood administered by the syringe-cannula method."

When choosing a method, one must consider the facility with which the blood can be given. There are two methods by which unaltered blood has commonly been given: First, the direct, by uniting the artery of the donor to the vein of the recipient (or the vein to vein); and second, the indirect, or syringe-cannula method. The direct method has never been popular for two reasons: it is difficult and tedious, whether the vessels are sutured or cannulas used, and there is no known way of accurately measuring the amount of blood given. The second, or indirect, method for giving whole blood, either by Lindeman<sup>7</sup> syringes or with a two-way stopcock apparatus like the Unger,<sup>8</sup> is at present the best. By either of these methods the blood can be rapidly given and the dosage accurately measured.

One great advantage of the citrate method is its ease of performance for any one familiar with venipuncture. Several procedures have been devised, in fact any salvarsan apparatus can also be used. A simple method will be described in this paper.

For the majority of cases that require transfusion, the citrate method will prove safe and satisfactory.

A theoretical explanation of the efficiency of sodium citrate to prevent clotting is given by Howell<sup>9</sup> after Sabbatani: "The calcium salt formed has a very small dissociation constant, so that the concentration of calcium ions is reduced below the minimum necessary to activate prothrombin to thrombin." The rôle calcium plays in clotting is to aid in the formation of thrombin from prothrombin.

That the early transfusion was an exceedingly dangerous proceeding is now well known; this is due to the fact that isoagglutination and isohemolysis had not been discovered.

In matching the blood for these transfusions, a simple method was used. This method was suggested by Dr. James Ewing and has been used at the Memorial Hospital for two years. It is as follows: Two white blood pipettes are used. Rinse them with 10 per cent sodium citrate solution; fill one with blood from the donor two divisions on the stem of the pipette, then to the one (1) mark on the stem with blood of the recipient; then with 10 per cent sodium citrate solution to the eleven (11) mark. The second is filled in the same manner, but the proportion of donor to recipient is reversed. The pipettes are then incubated at 37° C. for five to ten minutes; a small drop is placed on a clean slide, covered with a cover slip and agglutination looked for with the low power microscope. It is important to have a small drop so there

will be no mechanical clumping. If agglutination is present in either pipette, do not take the donor. The first pipette is, however, the most important.

An objection has been raised against this method, namely, that the dilution in the first pipette is too great. (This must be admitted to have a theoretical basis).

Most authors agree that the grouping method is an almost perfect procedure and will not result in hemolysis. That all persons are in one of four groups was first noted by Jansky<sup>10</sup> and later confirmed by Moss.<sup>11</sup> The ideal method is to have a number of professional donors grouped so that the proper one can be selected after grouping the recipient's blood. It is well to have several so-called universal donors available at all times.

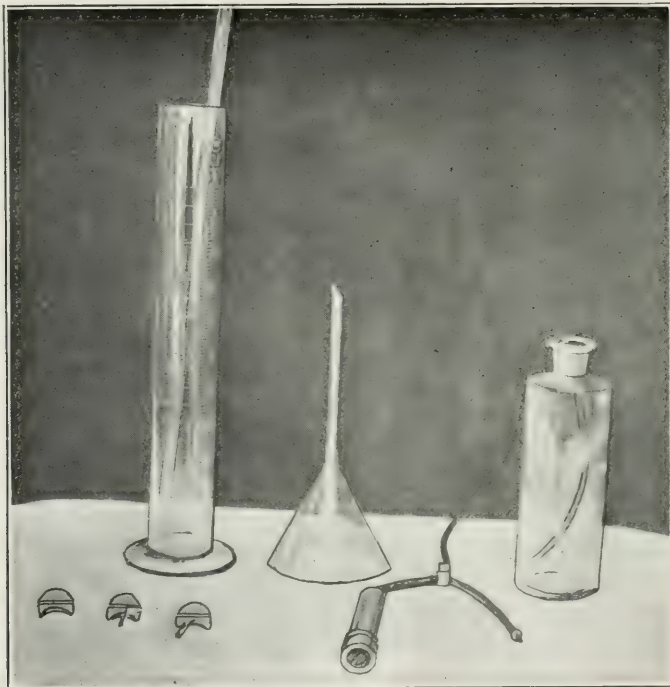


Fig. 1.—Showing apparatus required for the transfusion.

The question of syphilis is obviously a very important one as there are recorded cases of its transmission by blood transfusion. We have selected close relatives so far as it was possible—husband, mother, brother, etc.—and have carefully questioned them for luetic history. The professional donor should always be Wassermann negative and his history for possible recent infection be elicited.

The apparatus used is a salvarsan apparatus and was first shown to me by David MacKenzie, of Montreal. It consists of a bottle, or flask, three-way valve, 20 c.c. Luer syringe, rubber tubing, graduate, funnel, glass rod and cannulas. (Fig. 1.) We have found the Unger cannula very satisfactory. All the apparatus is first rinsed with 2 per cent sodium citrate solution. The blood is



then collected in the graduate from the donor, who may be in the same or adjoining room; or, as in one of our cases, away from the hospital. Ten per cent of the volume of blood desired, of a 2 per cent sodium citrate solution is first added; e. g., 50 c.c. when 500 c.c. is required. The blood, therefore, is in a 0.2 per cent solution of sodium citrate. When inserting the cannula, it is advantageous to insert it first between the skin and the vein, then at a point above the skin opening, enter the vein. This permits a valve-like action and there is little bleeding, even after the use of the large cannula. With a little practice this can easily be done. The blood should be gently but thoroughly stirred during collection to get a good admixture. The blood is then strained through gauze into the bottle, and pumped into the vein of the recipient through the three-way valve, being careful to exclude all air from the tubing.

Attention is called to the following important points:

1. The sodium citrate solution must be freshly made with chemically pure sodium citrate and freshly distilled water. This solution deteriorates.

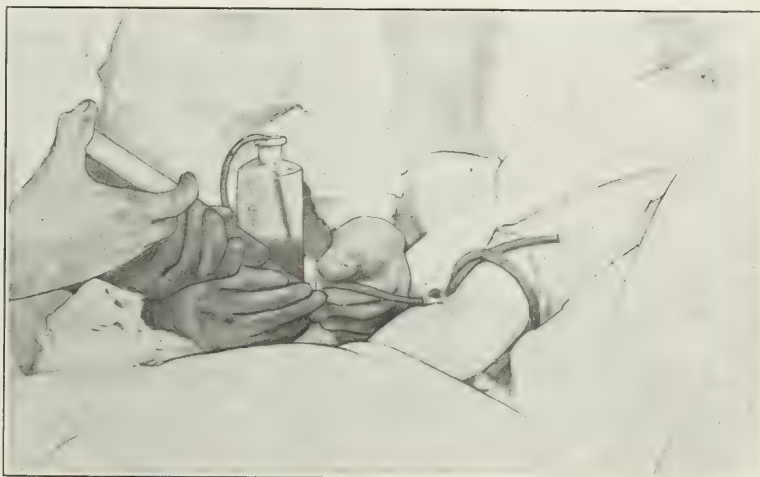


Fig. 2.—Showing method of injecting by drawing the blood from the bottle into the 20 c.c. Luer syringe, turning the valve, then forcing it into vein of recipient.

2. Rinse all apparatus with the sodium citrate solution.
3. Use a large cannula to secure blood from the donor so that it may be collected quickly. (We have collected 500 c.c. in four and one-half minutes.)
4. Exclude all air from the apparatus by first filling the syringe and tubing with blood.

The advantages of this apparatus for transfusion are: First, its simplicity, one physician and a nurse can operate it; second, the blood can be rapidly or slowly given; third, the blood can be kept at an even temperature by placing the bottle in a basin of warm water.

Pemberton<sup>12</sup> advocates having the blood in 0.24 per cent, Lewisohn<sup>13</sup> and Garbat,<sup>14</sup> 0.25 per cent solution of sodium citrate. Clotting may occur in a weaker solution especially if the donor has previously given blood. Some clotting occurred in two of our cases, but it was due, I believe, to the fact that the

blood did not flow freely from the donor. The large cannula obviates this difficulty.

The indications for transfusion in this field are:

- I. To replace blood lost from uterine or other acute hemorrhage.
- II. To replace blood and stimulate the hematopoietic system in secondary anemia due to repeated hemorrhages of small amounts and toxemia, or both.
- III. To cure hemorrhagic diseases, especially hemorrhages of the newborn.
- IV. Preparatory to operation.
- V. In toxemia of pregnancy.
- VI. As a prophylactic and curative measure in sepsis.

My observations with this method include eighteen transfusions given to seventeen patients. The obstetric cases were from the service of Dr. J. Clifton Edgar at Bellevue Hospital and Manhattan Maternity and Dispensary, the gynecologic cases were at the Memorial Hospital. They may be grouped according to the indications:

#### GROUP I. HEMORRHAGE

There were three obstetric cases benefited by transfusion; 375 c.c. of blood was given to one, and 500 c.c. to the others. Hypodermoclysis was used during the operative delivery and this was supplemented by the transfusion. To one case, a partial placenta previa with shock from the delivery, 1500 c.c. of saline was given and 375 c.c. of blood afterward. The red blood count was 3,250,000 with 80 per cent hemoglobin before the transfusion and 3,280,000 with 75 per cent hemoglobin the following day. To another, a forceps delivery followed by postpartum hemorrhage, 1000 c.c. of saline was given and 500 c.c. of blood. The red blood count was 2,170,000 with 45 per cent hemoglobin before the transfusion and 3,010,000 with 70 per cent hemoglobin the following day. The third case was admitted to the hospital with a ruptured uterus. Upon this patient a hysterectomy was performed, and she was given 2500 c.c. of saline during the operation and 500 c.c. of blood afterward. The red blood count was 850,000 with 15 per cent hemoglobin before the transfusion and eight hours afterward 1,856,000 with 35 per cent hemoglobin. The red blood count three days later was 2,892,000 with 50 per cent hemoglobin. For the first three days after operation her condition was very satisfactory. She died on the fourth day and no autopsy was obtained.

In these cases the blood is advantageous for the reason that it supplies, temporarily at least, a functioning tissue, which lessens shock and undoubtedly increases resistance to infection.

There has been no opportunity to transfuse a case of accidental hemorrhage or ruptured ectopic gestation.

#### GROUP II. SECONDARY ANEMIA

There were six transfusions given to five patients. Four of them had carcinoma of the uterus with an anemia produced by loss of blood plus the toxemia of the disease. With one exception, a very advanced case that died eight days

after transfusion, the results were very satisfactory. In the favorable cases there was an increase of red blood cells ranging from 700,000 to a 1,000,000 and hemoglobin 10 to 20 per cent.

The fifth case in this group was one of hematemesis during pregnancy. Following spontaneous premature delivery she received 500 c.c. of blood and there was no more bleeding. A diagnosis of gastric ulcer was made and she was later transferred to the medical service, where she died twenty days after delivery.

#### GROUP III. HEMORRHAGIC DISEASES

There were two cases of hemorrhages of the newborn and one of purpura hemorrhagica occurring in a pregnant woman.

The two cases of hemorrhages of the newborn were cured almost immediately by giving respectively, 100 and 75 c.c., of citrated blood. In no other condition was the result so evident. One baby had been oozing continuously from a hypodermic puncture, made by giving toxin-antitoxin for immunization against diphtheria, and this bleeding stopped almost instantly at the conclusion of the transfusion. The other was a typical one of hemorrhage of the newborn and was cured by transfusion into the longitudinal sinus.

The purpura hemorrhagica patient was in the seventh month and received 250 c.c. of blood. No new spots developed and she subsequently was delivered normally of a healthy baby.

#### GROUP IV. PRE-OPERATIVE CASES

There was only one patient in this group, a case of bleeding uterine fibroid. Four hundred c.c. of blood was given and a bloody vaginal discharge followed.

The value of the transfusion was lost in this instance, for we waited several days before operating and during that time considerable uterine bleeding occurred. We feel, therefore, that in such instances it is better to operate promptly after the transfusion is given.

#### GROUP V. TOXEMIA

Three patients were transfused for toxemia of pregnancy. One, a severe toxemia of the liver type with pronounced dehydration, received 500 c.c. of blood after an operative delivery. She made a rapid, uneventful recovery and the red blood cells increased from 3,288,000 to 3,776,000 following the transfusion, while the hemoglobin was increased 10 per cent.

Two cases of pernicious vomiting were transfused. In one the transfusion was unsuccessful, as the patient became cyanotic, with rapid, thready pulse after 60 c.c. had been given; the transfusion was then stopped. In the other 250 c.c. was given and, while there was some temporary improvement, in the course of a few days the nausea recurred in a severe form and it was deemed advisable to empty the uterus.

#### GROUP VI. PROPHYLACTIC AND CURATIVE MEASURE IN SEPSIS

There were two patients transfused. To one the blood was to be given as a prophylactic and to the other, as a curative measure. In the first case the transfusion was discontinued after 40 c.c. of blood had been given, as the pa-



tient became slightly cyanotic, restless, and had a severe backache. The other patient had streptococcus hemolyticus bacteriemia and received 250 c.c. of blood. The infection was severe and she died five days later.

Polak<sup>15</sup> reports favorable results from repeated transfusions of small amounts in bacteriemia and thrombophlebitis.

Excluding the two cases described, where the transfusion was stopped, no reaction was severe. Eleven had no reaction; five had chills, with a rise of temperature from 100° to 102° F. In the septic case the temperature rose from 102° to 102.8°.

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480 PARK AVENUE.

## Society Transactions

AMERICAN GYNECOLOGICAL SOCIETY. FORTY-FIFTH ANNUAL  
MEETING HELD IN CHICAGO, ILL., MAY 24, 25 and 26, 1920

(Continued from October Number.)

In a **Symposium on Radium Therapy** the following papers were read:

DR. WILLIAM S. STONE, of New York City, **The Present Position of Radium Therapy as an Educational Factor in the Diagnosis of Uterine Cancer.** (Original article to be published in *Surgery, Gynecology and Obstetrics.*)

DR. WILLIAM P. GRAVES, Boston, Mass., **Operation or Radium for Operable Cancer of the Cervix.** (For original article see page 122.)

DR. FREDERICK J. TAUSSIG, St. Louis, Mo., **An Analysis of the Failures in Radium Treatment of Cervical Cancer.** (For original article see page 113.)

### DISCUSSION

DR. JOHN G. CLARK, PHILADELPHIA.—I have a series of 30 cases that have lived over three years. The women are apparently well. The first case was treated in 1914, was forty-three years of age, and had previously had an amputation of the cervix, followed by prompt recurrence of the cancer. A previous amputation was done by cauterization. This patient has gone over six years. I gave her up about a year ago as hopeless as she had apparently a recurrence of the disease in the bladder. We reapplied radium. She has gained since then fourteen pounds and has gone back to her work.

The next case of inoperable cancer of the cervix dates back to 1914. Her physician reported a few days ago that she has had no bleeding, no leucorrhea, no pain, and her general health is very much improved. Examination shows she has been in good condition since.

One of the most remarkable cases we have had dates back to 1915. This patient had been operated for deciduoma malignum, with prompt recurrence and a very large mass in the pelvis. We have serial sections of that case. She now drives her automobile. A remarkable thing is she is only 27 years of age. The deciduoma malignum of the vagina was treated first in 1915. I saw her about two weeks ago. There is no trace of recurrence of the disease and she has been entirely well for five years.

Another patient first seen in 1915 is also entirely well. I might go on and repeat several of the cases, but it is hardly necessary to do so.

Up to the present time, in all my personal discussion of the matter I thought it was unwise to dwell upon the question of cure in this sense. I not only hold up to this time but still hold tentatively to the dictum which Dr. Graves has put before you. The astonishing thing is how few operative cases I find nowadays. My statistics show strikingly how the operative indications have steadily diminished. We have in this list a woman who has gone on for five years. She was pregnant, with a cauliflower cancer; the mass was cauterized and radium applied, allowing her to go to term. She went to term and bore a baby. I saw her not more than three or four days ago. She is perfectly well. She has gained four and a half pounds, and she says she feels better than she ever did in her life. She feels that radium made her young again. In spite of the fact that we get serious criticisms for applying radium where a patient has subsequent pain, she gets a radium energy. This case I am going to hold back and hope sooner or later to make an extended report of it.

As to the question of operability, I was interested in Dr. Graves' statistics. I cannot help but feel, when we analyze the ultimate results with the ones now before us, that we will approach them closely, taking into account some of the seriously inoperable cases.

As to fistulae, I have a feeling that we will prevent rather than cause them in a very definite percentage of cases. There is no doubt that we do cause them, but in curing these local growths the patient who is ultimately dying from metastatic extension may escape this catastrophe.

As to the preoperative treatment of carcinoma, I cannot help but feel there is an error in the doctor's paper. It is not based on facts so far as I have them. When he says he has had strikingly good results in the postoperative treatment, that is, where there is recurrence, it seems the wisest possible thing to follow the advice that Dr. Howard Kelly has given, namely, to make radium application before doing a radical operation, then proceed with operation in thirty-six to forty-eight hours before serious changes in the tissue become evident. That is all the disagreement I have to make except to say that I am finding fewer operative cases. That is the basis of my optimism in the cases I have spoken of before.

As to the question which Dr. Taussig brought up, namely, the difficulty of treatment, I do not personally share that feeling. In the first place, I am dealing with small doses and not with large amounts that Dr. Kelly, Dr. Burnam, or Dr. Bailey are disposed to use. I am dealing only with 100 milligrams applications.

Since I have been using large masses of gauze to pack the rectum and vagina out of the way, we have had fewer difficulties than before, consequently I think it is more a matter of distance in getting the tissues out of the way.

As to first and subsequent treatments, my associate (Dr. Anspach) and I have already raised the question whether sometimes we had not treated some of the cases too much. In other words, some of the best cases had been women who had gotten well apparently and would not come back to us as they were in such excellent shape. If we do not get a result in two treatments, we do not try any more.

Another point is attacking hopeless cases with radium: If these women have pain, as they will have if we radiate them heavily, they will blame us for having produced this terrible pain. We are commencing to sift out our first 150 cases. We are sifting out and turning away the perfectly hopeless cases. A large proportion of deaths occur within three months after the application of radium and some of these patients may be dying when they come to the hospital.

DR. ARTHUR H. CURTIS, CHICAGO.—Of all cases seen up to five years ago, namely, 79, the relative curability was 34 per cent of 48 cases operated.

DR. CURTIS F. BURNAM, BALTIMORE.—Radium, with its intriguing possibilities, has turned us towards a much more thorough study of cancer of the cervix. Before the age of radium, I was interested in cancer of the cervix only to the extent of making a diagnosis and determining whether it was operable or inoperable. With radium the possibility of treating successfully, or helpfully at least, extends from the very incipency of cervical cancer to the last stages. Each case presents a problem in itself. It is natural, therefore, that we are all greatly awakened in regard to the study of the progress, development and entire history of this disease.

There are three general methods of applying radium: First, the topical application to the cervix, which is possibly the only way necessary in early, operable cases or, at least, in those operable cases where radium is employed instead of operation. Second, imbedding suitable emanation carrying points directly in the cervix and parametria and into the fixed masses on the pelvic wall which occur in inoperable cancers of the cervix. One can by this technic delay the disease, doing away with pain and in some cases curing, where topical applications yield no results. This method is also applicable in conjunction with operation in the treating of fixed gland metastases, particularly in the iliac groups. Third, trans-abdominal treatment, such as Dr. Bailey and I have used for several years, is a valuable adjunct in the extensive cases and permits of a formal, much more radical technic than that afforded by the topical application alone. To carry this out, however, a distance of at



least 10 cm. from the skin must be used, many skin portals and a large amount of radium, and plenty of time must be available.

Dr. Graves has presented wonderful results—better than we have had in Baltimore and, in many respects, better than most of those which have been published. I wish to congratulate him. I am sorry that neither he, Dr. Taussig nor Dr. Stone considered the different types of cervical cancer and the results in treating these different groups. It is not enough to recognize that there is an adenocarcinoma of the cervix or a squamous cell epithelioma, but it is important to bear in mind that there is a typical basal cell epithelioma of the cervix, which is common, which responds to radium admirably and which is not so likely to be metastatic. There is no danger or difficulty in doing a hysterectomy two or three days after a preliminary radiation, such as one would carry out in an operable case where the two methods are combined. Neither we, personally, nor our colleagues in Baltimore have lost a patient in this way.

Through the interest and courtesy of our confreres in Baltimore, as well as outside the city, we have been able to collaborate in operative and radiation technics. My impression is that it is much better to radiate before operation and that it can be done more efficaciously.

There is no excuse whatever for vesical or rectal fistulae in operable or early inoperable cancers of the cervix after radium treatment. Where there is an enormously extensive growth and where it is widespread over the vaginal walls, such a complication is sometimes unavoidable. However, it is better to have a resulting fistula, as this may be repaired later, than to die of cancer.

I want to emphasize my feelings that the members of the American Gynecological Society should stand together and should develop some standard method of recording the clinical findings in cases of cervical cancer. When I began using radium I did not appreciate the importance of the rectal examination, nor did I know that strictured ureter was a contraindication to operative cure. Every patient ought to be carefully examined and, so far as is possible, the exact extent of the growth determined and recorded before any treatment is carried out. A small cancer of the cervix with a movable uterus which shows two or three isolated nodules in the vaginal wall is inoperable. It might seem a very easily operable case if hasty or incomplete examination were made. With radium the treatment of such a case has a very different prognosis from the inoperable case due to extensive infiltration and fixation through the parametria. It seems to me, too, that the combination of radium and operation might be employed with advantage in the squamous cell cancers of the cervix, where the radium is capable of taking care of the local lesions but where there are regional gland metastases and where a thorough cleaning out of the regional glands operatively might be done in exactly the same way that we do in lip and breast surgery; I mean a radical Wertheim removal plus a thorough gland removal has proved to be too great a surgical undertaking and too fraught with a high mortality to be systematically carried out. I feel that it is a great mistake to discard our operative measures. I think the wisest course to pursue is to analyze our operable cases after separating them into three or four groups; some should have operation alone, some should be radiated alone, and some should have the combined treatment.

Dr. Kelly and I have had 34 inoperable or extensive borderline cases, all of which are well now, five years after radium treatment. I feel, therefore, that it is possible to permanently cure with radium, but it is undeniable that certain types of growth are very resistant to radium destruction and yet are curable by radical removal, provided they are not too far advanced. This we know positively to be the case in lip and skin cancers and it seems that it would likely be so in cancer of the cervix uteri.

DR. C. JEFF MILLER, NEW ORLEANS, LA.—After an experience covering a period of six years and comprising 104 cases of cancer of the uterus, I am thoroughly convinced that radium is the most valuable adjunct to surgery thus far suggested. It has been unfortunate that so much discussion has been indulged in regarding radium *versus* surgery. No one, except the earlier enthusiasts, has claimed that radium would supplant surgery and now that we have abundant clinical data, it is possible to determine the indications and limitations of radium, as we have previously done with radical hysterectomy.

From the statistics now available, I believe the following deductions will be acceptable to the majority of those using radium. In early cancer of the uterus, surgery is unquestionably indicated. It is possible that it may be eventually shown that the results of radium in the early stage, may equal those of surgery, but until this is known, we should insist upon operation. In regard to the borderline cases, we may just as positively insist that radium yields as good or better results than surgery.

In this group we feel that we have made distinct progress; for the operative results have never been satisfactory in eradicating the disease, and in addition they often furnished a train of postoperative sequelæ, that added to the burdens of the patient. I am confident that a large series of cases in this group will show better end results, than the same number treated by surgical intervention.

In advanced cases there is no longer any question but that radium accomplishes more than any other therapeutic agent. We have learned, however, that material from this group must be selected with some care. Fistulæ are so prone to follow radiation in cases presenting an advanced stage of ulceration, that it is occasionally wise to advise against radium. Originally, we had hoped to increase the operability of advanced cancer by first using radium, and operating after the process had been controlled. This hope has been dispelled by the insurmountable difficulties encountered in dissecting the pelvic structures after radiation. Some authorities still advocate operation in occasional cases, but on the whole I believe that once radiation has been undertaken, it should be continued without operation. Incidentally, it may be added here, that curettage and cautery in advanced cancer, preliminary to the use of radium, do not enhance the results of the treatment, and carry with them some objections.

We have not been able, as yet, to prove that the preliminary use of radium before operation in early cases, has any distinct advantage. It has a rational basis, however, and if operation is undertaken within ten days after radiation, no complications should be anticipated, and many cells, overlooked during the operation, may thereby be affected.

I am not certain that we have proved the value of postoperative radiation, although I recommend it. A few observers have studied parallel series, and proved to their satisfaction that recurrence was retarded, but such observations necessarily require a long period of time, and a large amount of material to definitely settle this point. Since we are gradually formulating clinical rules in regard to the use of radium, it is to be hoped that something can soon be authoritatively offered regarding the dosage. So far, this is still confusing, and capable surgeons and small institutions, who might purchase an amount that would place radium in a community, hesitate when one authority uses a gram, while another is using 50 milligrams.

The clinical results, at present available, do not show such a marked difference between the cases treated by massive dosage and those treated properly with a hundred milligrams, as to discourage the surgeon who has a limited supply.

We have all had experience with proctitis following the use of radium; just why the rectum should not tolerate radiation as well as the bladder, is not known, but every precaution should be taken to prevent it. In cases presenting rectal involvement, especially if symptoms of partial obstruction are present, a preliminary colostomy may be considered. I have resorted to this in several instances, and later applied radium freely to the vaginal vault and in the bowel, without causing annoyance. This is a point that should be emphasized, for not a single case complained of tenesmus.

My experience with vulvar cancer is practically the same as that related by Dr. Tausig. They do not respond as does uterine cancer, and my results have been disappointing. I had hoped that Dr. Burnam would have something to say regarding his results in this group.

Altogether we have distinctly advanced the status of the treatment of cancer by this valuable adjunct. We have alleviated pain, controlled infection and prolonged life in the hopeless cases; eliminated a large group from the surgical list, and frequently permanently cured cases in every group that were not amenable to surgical intervention.

DR. HAROLD C. BAILEY, NEW YORK CITY.—I think Dr. Graves' paper was very timely because it shows us that we still have more than one method of dealing with these cases of cancer. He is to be complimented on his statistics, especially with regard to early opera-

tive mortality. I take issue with him, as did Dr. Clark, on the preoperative or postoperative treatment. These are two problems that have to be worked out. The amount and time for the preoperative treatment must be definitely determined. I believe that, if the preoperative treatment is given, further postoperative treatment will have to be very mild. We have in the postoperative treatment great advantages. Here we use masses of radium and the parametrium is pretty thoroughly radiated.

Dr. Burnam brought up the question of the type of growth and this we must definitely understand. The columnar and basal cell type acts differently from the squamous cell. There is also a particular resistance or immunity of these individual patients to radium.

With regard to the control of dosage, we have now developed a method of measuring dosage, by the skin dose, so accurately that we can tell exactly how many centimeters into the parametrium the dose is delivered from within the uterus and vagina. Some of the bad cases do not respond to radium used on the limit of a skin dose and some of those treated in the routine way who unexpectedly have openings in the rectum, we find have a low skin dose.

DR. REUBEN PETERSON, ANN ARBOR, MICHIGAN.—The propaganda, in Michigan so far as cancer is concerned, may be said to have failed for cancer of the cervix. We have been endeavoring for the last ten or fifteen years to aid in the propaganda for cancer, but I cannot say that the operability is any better today than it was at that time. Therefore there is something Dr. Stone has brought forward which we ought to consider, namely, whether we have not been dwelling too much upon the cure of cancer by operation. If people are urged to take advantage of radium, we may get more women to come to us at a time when either radium or operation can be used to advantage. I fear, however, unless Dr. Stone and other men who are using radium are honest with the people, the same thing will happen as occurred in the operative treatment of cancer. All the patients undergoing the radium treatment will think they are going to be cured and in the popular mind the treatment will fall into disrepute if only a comparatively small number are cured.

I was delighted with Dr. Graves' results. He has not very definitely told us how the percentages were arrived at. Notwithstanding his explanation, I am free to confess I do not know what he means by 34.2 per cent or 19.1 per cent. So far as the figures are concerned, I cannot discuss his results, but I do know that he has had a very low mortality and, if combined with that low mortality of 5.2 per cent he can show at the end of five years a large number of patients living and well, he is to be congratulated.

I have never used radium in cases of cancer of the cervix; my work on such cases has been entirely operative.

I think what Dr. Burnam has said is perfectly true, that we are not scientific so far as our definition of what kind of cases we are operating upon or treating by radium. Until cases of cancer are standardized, the whole thing is bound to be in a state of confusion, so standardization should come as soon as possible.

When we turn to Dr. Taussig's paper and the chart he showed and the results, the outlook is not hopeful so far as combining radium with the operative treatment. We must perforce pay attention to the conclusions of men who have had such large experience with radium as Drs. Clark, Burnam, and Miller, and it will undoubtedly lead those of us who have no radium, but who have had simply operative experience with cancer, to consider whether it is not our duty to take up this treatment by radium.



## JOINT MEETING HELD WITH THE CHICAGO GYNECOLOGICAL SOCIETY

- DR. HARRY E. MOCK, of Chicago, Ill., read a paper (by invitation) entitled **The Gynecologic Problems in Industrial Medicine**. (For original article see page 131.)
- DR. FRED L. ADAIR, of Minneapolis, Minn., read a paper on **The Development of Prenatal Care and Maternal Welfare Work in Paris under the Children's Bureau of the American Red Cross**. (For original article see page 141.)
- DR. GEORGE W. KOSMAK, of New York, read a paper entitled **The Importance of a "Follow-up System" for Obstetric Patients**. (For original article see page 155.)

### DISCUSSION

DR. THOMAS WATTS EDEN, LONDON, ENGLAND (by invitation).—During the great war the people of the nations involved, men and women alike, had to consider the question of the value of the work they were doing from a new standpoint, that standpoint being not its value in pounds or dollars but its value to the state. We as doctors have likewise had to revise our ideas as to the value of our medical work.

The battalion medical officer in the field whose duty was to keep his men fit, to examine their teeth, to keep them clean, and to attend to their small ailments and complaints, was probably doing work as useful to his country as the surgeon performing brilliant operations upon men who were dangerously or hopelessly wounded. I think it is very important we should not lose sight of that lesson now that the war is over. The medical men and women who remained at home were engaged in getting the last ounce of productivity out of men and women who were engaged in industrial pursuits. Now, as I see these lessons, I think they ought to be to a great extent permanent lessons and, it seems to me, the time has come when we as obstetricians and gynecologists ought to ask ourselves whether the work that we are doing is as useful to the state as we can make it, or whether it is not. If it is not, then we should try to improve it. Up to the present time we have been mainly engrossed with surgical problems. When I think of what gynecology was like when I first graduated in the University of Edinburgh, it seems like a fairy story when one compares it with the present. When you think of what that great American, Marion Sims, was able to do, and what you can do in an American hospital today and see other men doing, the story is almost incredible. The same applies to midwifery. Lying-in hospitals sixty or seventy years ago were swept by periodic epidemics of puerperal sepsis, with a mortality of 30 to 50 per cent. Now we can conduct labor under hospital conditions almost without any risk to life. But I do not think that we can go on immersing ourselves in surgical problems and hospital questions alone.

As regards surgical problems, the limits to which we can go as surgeons have almost been reached. I have seen quite a lot of surgery since I came to your country about ten days ago, and I do not think that the ingenuity, the resources, the dexterity of the American gynecologist can develop very much farther. They will have to occupy themselves with some other problem. I think we ought to take a wide view of our responsibility and ask ourselves whether there is not something else we ought to develop other than surgical procedures. I would suggest that we ought to consider ourselves responsible for the care of the health of women and girls during the whole period of their sexual activity and during the whole process of reproduction, to the care of the special disorders to which they are liable, and to the care of the child during birth and the first month of its life. There is a great deal in this that is not surgery, but preventive medicine.

First of all, I would ask you to reflect on the position of midwifery. As a stranger in your country, I want to make it clear in the things I am going to say that I have no

intention of saying anything discouraging about midwifery in the United States, and what I am going to say applies only to England.

I think our hospital midwifery is very good indeed, perhaps almost as good as yours. We have to remember that while gynecology is in the hands of the elect, a few specialists, the bulk of midwifery in the country is done by general practitioners and midwives; that is, 40 per cent of the confinements which occur in Great Britain are attended not by doctors, but by midwives. The proportion of women who have their babies under hospital conditions and under the care of specialists is very small, and we find there is an enormous gap between the level of our hospital midwifery and the midwifery of the country as a whole. For every 1000 babies that are born in Great Britain a year, we lose four or five mothers, the greater number young and healthy women. Of this mortality, one-third is due to puerperal sepsis, which is a preventable disease. The remaining one-fourth is due to hemorrhage and other accidents of pregnancy and labor which proper attention would reduce almost to a minimum, and which we do reduce to a minimum in our hospitals. If the standard of midwifery were as good for the whole country as it is in the hospitals, we would at once reduce the puerperal mortality about one-half. I suggest to you that this is a condition for which we English obstetricians must consider ourselves, at any rate, partly responsible. It is no good blaming the doctors and midwives because it is our business to train them and fit them for their work; therefore, inasmuch as the bad results they get are due to imperfect training, the responsibility must rest upon our shoulders. The conditions are not exhausted by the statement I have made. We must remember that the mortality includes only the fatal cases of puerperal sepsis of which we have any record for a number of years.

We have now a system of notification of puerperal sepsis as of any other infectious disease. We have no reliable statistics upon the incidence of puerperal sepsis. One cannot put puerperal sepsis at much higher than 20 per cent; therefore, we have five times as much illness from puerperal sepsis as appear in our case mortality. This means an enormous amount of invalidism and illness and loss of productive capacity scattered over the whole country. In addition, we have an enormous bulk of minor septic ailments which are not reported and which do not cause death, but a month or weeks afterward these women come to the hospital for the relief of chronic infective conditions that we see so much of. This means further a very large amount of invalidism due to "bad midwifery" and then comes, of course, the question of permanent sterility which often follows these conditions. If we could by some method raise the level of the practice of our doctors, or approach the results which we get in our hospitals, we could relieve the country of the heavy maternal mortality as well as an almost incalculable amount of maternal illness.

Our infant mortality for the first year is somewhere about 10%; before the war it was 10.5%. I think it is something to our credit, notwithstanding the difficulties and complications in war times, that the mortality for 1919 was the lowest on record. It fell to 90, although the infant mortality is roughly 100 per thousand. Forty per cent of it occurred in the first month of the first year; that is, something like one-half of the mortality of the first year occurred during the period for which the obstetrician as a teacher is responsible. There is this confession I must make, too, and that is, although the infant mortality is diminishing, as I have told you, the diminution is apparent chiefly in the latter months, and not in the early months, and there is almost no diminution in the mortality of the first month. Therefore, I think the English obstetricians cannot comfort themselves by thinking the conditions as regards infant mortality in the period for which they are responsible are improving to any recognizable extent. I do not know whether such conditions as these prevail in the United States or not. If they do, I hope you will take the same view of it as we are taking, that is, it is our duty to set to work in the most serious way we can to find some remedy for this deplorable condition.

If we begin to ask ourselves what these bad results are due to, we come to the conclusion that they are mainly due to two conditions. The first I have referred to, that is, bad practice following bad training of our students, and second, to imperfect hospital provisions for midwifery cases. I believe that the latter difficulty is one which

you have not with you. My friend Dr. Davis told me the other day there was ample provision in American cities for all obstetric work. That is not the case with us. We have not sufficient hospital accommodations for midwifery cases and as a result it often happens that complications during pregnancy and labor cannot receive prompt, skilled assistance. We are laying down for ourselves the standard, that the country should provide for complications of pregnancy and labor ample hospital accommodations, as it has already provided for surgical complications. In a case of acute appendicitis there is usually no difficulty in finding a surgeon who is competent to operate on it. And so the country ought to provide equally for a serious obstetric emergency by finding some one who is capable of dealing with it the same as a surgeon is capable of dealing with an acute case of appendicitis.

The question of training of students is a much more difficult matter. I desire to state that the principle we are striving to have accepted by teachers is this: medical students should learn the conduct of normal labor and the common obstetric complications in hospitals under the eye of their teachers, and they should be given adequate experience in these ordinary complications before they are turned out to practice. A common requirement of the examining body is that students shall have attended a certain number of cases and they do not seem to care where they attended them. The student ought to be taught the conduct of normal labor as a surgical procedure in hospitals and by properly qualified and experienced teachers. I do not think there is any clinical subject in the whole curriculum of more importance from the point of view of the health of the public welfare than the training of the student in the conduct of normal labor. He can learn, if he likes, how to do a gastroenterostomy, but he will not do it for many years after he is qualified, he will have to attend confinements within a few months after the time he puts up his name plate. Yet he is taught this important task in a more clumsy manner from a clinical point of view than any other. If we could get these matters adjusted, we would go a long way toward improving our bad records as regards maternal mortality.

The case of the infant is quite serious, but I am glad to say we are on the right track to solve it. We have a net-work now of infant welfare clinics all over the country which are utilized for the training of medical students that are assistants to pediatric physicians, and very good work is being done in this way in training the medical students how to care for the infant in what I suppose is the most important period of its life, in which it stands in most need of scientific care.

There is one other point I would like to make; I do not think our hospital results are as good as they might be with regard to the baby. I think the infant mortality of labor in most lying-in hospitals is larger than it ought to be.

One of my friends in London (Dr. Holland) has been making a series of investigations on babies that died during birth. It is a research work done under the auspices of the government. His paper has not been published yet, but I have his permission to quote from it. He examined 168 dead babies, as they came from maternity clinics in London and in some other English towns. They were all short labors which had been attended with a reasonable degree of obstetric skill. I do not think any higher claim than that can be made for them because many of them were delivered by interns and not by the active members of the hospital staff. Fifty per cent of the babies died from intracranial injuries as proved by postmortem examinations. The injury, as a rule, consisted of a laceration of some portion of the membranes of the brain, followed by hemorrhage.

Dr. Holland had a certain amount of evidence, too, that minor injuries of this sort occurred from which babies recovered. They died sometimes of some other intercurrent condition during the process of healing of the laceration which itself is not fatal. So the suggestion is that there is a great deal of cranial injury done even by skilled attendants in normal labor in lying-in hospitals. Some of these cases were forceps cases, some breech cases, some were cases of normal delivery, but all of them showed these injuries.

Now, this is going to give us cause for a thorough examination of the methods em-



ployed because it is not only the question of babies that die of these injuries but we have to reflect on something beyond this. Is it possible that cortical injuries may occur in these conditions, sufficiently serious to cause permanent damage to the nervous system in later life. It is only by a prolonged system of "follow-up" that such a question can be answered, but it is a disquieting situation and one which we in England are taking seriously to heart.

Now, one or two words about the gynecologic question. As regards gynecology, I should like to make the suggestion that we perhaps have not paid sufficient attention to what is a very important period of a woman's life, and that is the period of secondary sexual development. Primary sexual development, of course, occurs *in utero*. If anything occurs seriously, we know the result is a gross developmental effect. Secondary sexual development is reached at puberty when the girl becomes a woman. There is a great deal of evident disturbance during this period which results in functional disorders of various kinds in the female sexual organs.

Some interesting observations were made some time ago by Malcolm Campbell, of Edinburgh, who showed that an arrest of development of the uterus in rats occurred by improper feeding. I think we should take into consideration the question as to whether we ought not to cause some systematic inquiries to be made into the effects upon the future sexual health of the girls, the conditions under which they live during the time of their secondary sexual development. For instance, there is a disorder we know by the name of spasmodic or primary dysmenorrhea. We do not know what it is due to. We do not know what to do with it. We do a number of small operations which are more or less successful or unsuccessful, as the case may be. It is curable by natural processes in the majority of cases but difficult for us to cure. Quite possibly it is the result of some defect or deflection during the period of secondary sexual development and sociological observers may easily settle such a question by undertaking a wide review and getting specific classified returns from large centers of population where girls of all ages and all classes can be observed under conditions in which they live. The results arrived at can then be classified and some important and valuable information may be obtained. If we can find some means of preventing the occurrence of this disorder, we would do a great deal indeed to prevent sickness, suffering and loss of work among the women of our country.

The status of woman is changing. The old idea that a woman is a delicate creature to be protected in time of danger and distress has quite gone by. I am sorry for the American or Englishman who suggests to any of his lady friends that is the proper rôle. Women are taking their places with men in every walk of life. They are in the professions; they are in business. During the war they put on trousers and did the work that men are usually employed to do. There is probably little they cannot do as well as the men; sometimes they do it better. Their only handicap is a physiologic one, and it is for us to educate the state, so that women shall have the fairest chance possible in the struggle that lies before them. These are very large responsibilities and if we are going to undertake them, we shall have to revise the character of our ideas of the work which gynecologists and obstetricians ought to pursue, and I make the suggestion to you in the hope that we may agree that the task is one which is worthy of our attention, and one which it is our duty to attempt.

DR. LEWIS J. POLLOCK, CHICAGO (by invitation).—Neurologists and gynecologists have, for generations, mutually shared the responsibilities of certain neuroses and psychoses. Not a long time ago the neurologist was instrumental in the collection of a great deal of pathologic material highly cherished by the gynecologists of the past generation: I refer to the numerous ovaries which were removed for the supposed cure of some types of mental disorder.

For many years there has been a constant effort to affiliate the gynecologist and the neurologist. Today this effort is reflected in such work as attempts to point out that the Abderhalden reaction shows a certain specificity to the sexual organs in dementia precox.

Hysteria has never been successfully divorced from its relation to the uterus. At first it was associated with the physical dysfunction of this organ, but with the advance in civilization we find it in close affinity with the *libido*.

Experiences in the recent war demonstrated conclusively some of the mechanisms entering into the formation of the neuroses, much, I think, to the disappointment of many men who uphold the theories of Freud which are based upon the hypothesis that hysteria and most of the neuroses are the result of repressions of unfulfilled desires which are related, in a broad sense, to the sexual sphere. Unfortunately for their hypothesis, the cases of so-called "shell-shock" were concerned with an illicit motive related to the instinct of self-preservation. Whether dealing with civil or with war neuroses, it is found that they occur in the presence of the conflict between the desires of an individual and his conceptions which have been built up by breeding, education, religion and social law. In the war neuroses occurred as the result of the inability of the soldier to adapt his wish to escape from danger and discomfort to his patriotism and his ideals; as a result there arose the defensive mechanism of a hysteria. Of course this process was an unconscious one. In civil neuroses the conflicts concern themselves not only with the instinct of self-preservation, but with the adaptation of an individual to social life. It is natural that many of these conflicts are related to the instinct of propagation of species and, therefore, sex.

Our ability to react adequately to the demands of society depends largely upon our education and, as a result, from a prophylactic standpoint, it is of the greatest importance that everyone be taught such things as particularly enter into the greatest conflict of life. The polish of civilization and the mask of society has not changed our status as animals. It is necessary to learn how to avoid the pitfalls encountered in the adaptation of our animal wishes to social mandates.

One of the great factors in the formation of neuroses is fear. Frequently this fear is related to masturbation. One thing has always forcibly impressed me; we are inclined to seek for this fear only among the male sex, although the same habit and the same fear occurs frequently in women. Insofar as sexual education is concerned the greatest efforts have been directed towards men. Fear reactions based upon incidents frequently occurring in childhood are often observed in the neuroses. In women these fears may be based on some unpleasant, disgusting, or frightful sexual experience, or some normal condition in the appearance of which they had not been instructed, for example, menstruation.

Inasmuch as the treatment of the disease is its prevention, it appeals to me strongly that we should make a definite effort to instruct all children during the period of the development of secondary sexual characteristics, in the physiology of sex, the normality of certain functions, the harmlessness of certain habits which will undoubtedly be exhibited by many children, and attempt to adapt them to a life in which the fulfillment of one's desires must be curtailed by social law.

DR. EMIL RIES, CHICAGO (by invitation).—The relation of gynecology and industrial medicine will impress the gynecologist a great deal more in the near future than it has done before. Industrial Medicine, Big Business, and Insurance will enter into our American medical life in a comparatively short time to such an extent that it behooves us to consider what is going to happen.

Dr. Mock, an apostle of industrial medicine in the United States, has mentioned already that under the present conditions a great many inferior men, men with insufficient education, men with insufficient experience, have gone into industrial medicine which seems to open up an easy way for them to make a sure livelihood. From such men we cannot expect any good from the standpoint of the development of industrial medicine. The consequence will be that questions of industrial medicine, so far as they concern the gynecologist, will soon be brought up to the Appellate Court of the Specialist, to determine the questions that have been raised by the industrial doctor.

There are not very many doubtful points in gynecology which are liable to appear in connection with insurance work. Congenital malformations can be ruled out. Obstetrical injuries have nothing to do with machinery. Tumors are more uncertain. But

the worst trouble we are going to have is with those conditions about which we ourselves are divided, the normal and abnormal positions of the uterus.

I heard Dr. Mock mention tonight as pathologic cases, one a sharp ante flexion, and three cases of retroversion. I am sure, there are quite a few gynecologists who do not consider a sharp ante flexion or a retroversion a disease. This question will come up in thousands of cases as soon as women who have had any injury in the course of industrial work present histories of headaches and backaches, which they explain on the basis of a malposition. The majority of general practitioners cannot make a diagnosis of retroversion or the position of the uterus in general. The average general practitioner cannot diagnose the position of the uterus at all, and when he does not feel the uterus he calls the position retroversion or retro flexion. Now the following is going to happen in hundreds of cases of industrial accidents: A woman in industrial work will come to the gynecologist and he finds a retroversion of the uterus. The first question is, did this retroversion exist before the accident? Second, whether it did or not, has it anything to do with the woman's symptoms? I can see twelve good men and true sit on the question and the Supreme Court will ultimately have to decide whether retroversion is a disease or not.

Dr. Mock opened up a wonderful vista of possibilities for gynecology. I have always regretted that women did not generally join the army and have an examination before they were admitted. If they received such an examination, we would know more definitely how many women carry the uterus backward and how many carry it forward. The percentages of the habitual positions of the uterus could be easily determined in that way, and Dr. Mock mentioned that certain industrial plants had started a system by which they insisted on a pelvic examination of their employees. That would be a wonderful and magnificent thing for us, and it would be the finest insurance for these industrial plants.

Naturally the women could not claim that their retroversion was due to an accident if they were known to have had it before they began work in the factory. The scientific gain would even be more enormous than the saving in dollars and cents for the insurance company. I foresee further that many of the functional disorders of the female, such as amenorrhea, dysmenorrhea, symptoms which are generally ascribed to gynecologic organic lesions, and yet rarely have anything to do with them, will be brought to the front. For instance, a backache will from that time on become more important to the gynecologist and attract his attention to a much more definite degree than it ever did before. When a woman files a claim for ten thousand dollars against the factory in which she is employed because she has a backache, we cannot disclaim the backache. Nothing is harder to disprove than an ache and that is where our gynecologic wisdom will be sorely tried. I foresee that we will have the same horrible spectacle that our good friends the neurologists have given the world in medico-legal cases. We may find five experts who will testify on one side that such and such is the case, and five for the other side.

I think industrial physicians and surgeons should use every effort to induce factories to insist on pelvic examination before employing women. Infections which are of a chronic nature and leave women with a more or less pronounced leucorrhea are very liable to be attributed by those women to their position in working or to the pushing of a piece of machinery against their body, etc. A jury is liable to be impressed with such statements. I was present in a case where a woman claimed that in consequence of stepping off a street car before the car had stopped completely, she had acquired carcinoma of the uterus and the jury gave her six thousand dollars.

Industrial medicine will do gynecology an enormous service if it will cooperate with the gynecologist in settling these important scientific points. Here is a wonderful chance, a chance the world never has seen before for gathering information about conditions of the female sexual tract which until now, for lack of large statistics, are still *sub judice*.

PRESIDENT DICKINSON.—When there is a school of hygiene in every city and an industrial clinic in every group of industrial workers, 75 per cent of the population in the urban and circum-urban regions will be in the hands of these preventories. In other



words, the greater part of the preventive work of the world two hundred years from now will be in the hands of the man who has written the first textbook about it and his colleagues. Industrial medicine is going to be a great development in the future of medicine, and it is time for us to get into it early and do our share of it.

I would like to introduce one speaker who taught me part of this work in the war in connection with the Shipping Board. He made a great record in this department and it gives me very great pleasure to introduce to you Colonel Philip S. Doane, now plain Dr. Doane, of Chicago.

DR. PHILIP S. DOANE, CHICAGO (by invitation).—Dr. Mock has spoken to you of industrial medicine largely from the standpoint of a surgeon. Most of the men in charge of industrial workers are surgeons; they know very little about gynecology. During the war I had charge of the health and sanitation of the shipyards and was much interested in the problems of their female employees.

In Washington and Philadelphia we had over 1000 women and girls who came to us from all parts of the country. They came for patriotic reasons; they also came for pocketbook reasons. These females were young, married, ex-married, and old. I tried to make a study of the gynecology conditions among these thousands of women and girls, and I divided them into various groups. First, the girls; second, the adult females; third, the ex-married women; fourth, the married women, and the wives of the male employees.

A few notations possibly will be of interest to you. The girls I found indifferent to any gynecologic conditions, usually because of ignorance. They were difficult to instruct because of lack of interest. They were afraid to report disease. I found that this class was most susceptible to seduction. I found that the lower or laboring class among these girls showed the most marked conditions which I attributed to lack of knowledge or to ignorance.

We established very shortly a dispensary staff and I called from the West nurses whom I had in my personal service to assist me in this particular work. From the intelligent nurses I was able to obtain quite a number of points of interest. I found it was necessary to follow Dr. Mock's ideas as he has given them to you and to carry out instructions with these girls in the care of themselves, their hygienic surroundings, dress, particularly food, which was difficult to obtain in Washington and Philadelphia during the war period, that is, food of the proper kind. We instructed them in habits and cleanliness. We also corrected the hours of work for these girls. I had the extended cooperation of my superiors who were heartily in accord with any measure that would add to the efficiency. We saw to it that these girls had proper light; that they had good, fresh air, proper drinking water, and good nutritious food.

We found the girls ate scantily at lunch time. A small piece of chocolate or something of that kind often sufficed. We looked into the toilet facilities which in many shipyards, in the offices, and so on, were very inadequate, very improper, and entirely wrong. The rest rooms we found to be of the very greatest importance. They were made clean, attractive, light and fresh. We placed competent trained nurses, as far as obtainable, in the various shipyards and offices, and in many instances we were able to obtain qualified women physicians. We found that the girls would not report to the male physicians and industrial surgeons, but would do so in many instances through the same nurse or competent female physician. We established clubs, exercises, and so on.

The adult females we found wiser than the girls as a general rule and they were open to instruction. We found the great majority of them had suffered from some past sad experience. They would readily consult a female doctor or a nurse. They appreciated every health and sanitary measure we established. We found the majority of ex-married women suffering from some female complaint and particularly among the laboring classes. We found, however, that it was difficult to obtain knowledge of their trouble because of their fear of being discharged. They would not report their trouble before employment. They might possibly report it after employment if promised a continuance of their job. They did not desire a record made of their disabilities. We found it advisable to keep a separate record of these cases, and the record was made after the

patient had left the dispensary, the record was not kept with the knowledge of the patient. We found that these ex-married women suffered from diseases usually of an infectious type, but in some instances the diseases were secondary to delivery by midwives. The married women in our employ were mostly young married women or recently married women. They were most willing to seek instruction and to be guided. They were not generally infected or diseased. They usually discontinued work on becoming pregnant. They profited by the previous instruction given them by the nurses or doctors. If the husband was an employee, his wife came under the care of the medical staff at the time of delivery. They were taught to avoid midwives.

What is the solution for this condition which confronts the gynecologist today? I feel that in every medical college there must be a chair of industrial medicine established. Dr. Mock already occupies such a chair and has a very great responsibility upon his shoulders. He must make preventive gynecology an important feature of instruction. The industrial surgeon must interest himself in this subject. I find female employees generally are ignorant in preventive gynecologic measures. I find the average trained nurse is more or less ignorant, and I find the industrial surgeon does not know anything, generally speaking of gynecology. This must be changed. The gynecologist in himself is absolutely too narrow; he is too much interested in operative work, too indifferent about a subject of this kind, and it is time that he should awaken to it.

DR. JOSEPH B. DELEE, CHICAGO.—As the hour is late, I shall make but few remarks on preventive obstetrics, particularly from a sociological point of view. The value of a pregnant woman to society is 100 per cent and her safeguarding depends upon the obstetrician. Why do we not have more obstetricians? Why do we have so many surgeons and so many men representing the other branches of medicine? The answer is very simple. The life of the obstetrician is not a happy one; the work is very hard, and the remuneration is inadequate. Careful and economic studies of women about to have babies are needed and it is more than possible that when industrial insurance and compulsory health insurance come the obstetrician will have to be one of the first to be consulted. It costs money nowadays for a woman to have a baby. The amount of time which prenatal work requires is not small. The number of visits, the number of urinalyses, the number of investigations of the woman's condition are large in the course of seven months antenatal care. The time spent in caring for the woman at labor is not minutes, but hours, sometimes days. Postnatal care also requires time and now comes Dr. Kosmak's follow-up system which will take another six months. If a few women can afford to pay for all this attention, well and good, but there are very many others who cannot afford to pay fees commensurate with the work; therefore, somebody must put up more money to give the poor women good obstetric care. Midwives cause a large percentage of the trouble, but the main reason for the trouble in women having babies lies in the function itself. Labor itself causes trouble. It is not possible for a large baby to pass from the uterus without causing material damage. How can we prevent this damage? We have to educate our doctors, but we cannot expect ideal results with obstetrics as low in public esteem as it is. People will not pay for obstetrics with the present standards. As long as the state allows midwives to practice obstetrics, people who have money to pay for it will not consider a confinement requires an expert, and so we have yet the task of raising the ideals of obstetric practice. If you will regard obstetrics as of pathologic dignity, you will immediately raise the ideal, for anything that is pathologic requires proper investigation and study and expert attention.

Dr. Eden reminded us of the high mortality of babies in normal delivery. It is a great confession on his part that a normal delivery can cause the death of the baby. I would say this is pathologic. Dr. Kosmak told us of the difficulties and the dangers of injuries to the pelvic connective tissue and cervix; that they have much to do in the causation of chronic inflammatory conditions in the pelvis. The prevention of these things requires a high degree of obstetric skill, much higher than is generally admitted, and the only way to get the public to appreciate that is to let them know that we doctors consider a normal obstetric case of the highest pathologic dignity.

DR. HENRY T. BYFORD, of Chicago, read a paper on **A Neglected Form of Cervical Endometritis.**

Dr. Byford said that the diagnosis and treatment of chronic endometritis, as they affect the middle and lower portions of the cervix, have been well described in our literature. But the same can hardly be said of inflammation at, or contiguous to, the internal os. Dilatation, eversion, erosion and cystic degeneration do not take place at the upper the same as at the lower end of the cervix. The internal os dilates only slightly. Its lumen is crowded with swollen and obstructed glands and the circulation is interfered with at first by the pressure from within and later from without by a contracting band of inflammatory exudate. On account of such interference resolution does not take place to the same extent as below and a ring of imperfectly organized connective tissue remains whose upper edge is at or just above the os and whose lower edge merges into the somewhat thickened mucous membrane below it. In multiparæ this band or constriction ring does not necessarily interfere with uterine drainage, but in nulliparæ it usually takes on some of the characteristics of stenosis.

The presence of this constriction ring is ordinarily overlooked by the practitioner who thinks in terms of tampons, and sometimes by the gynecologist whose scientific lenses are focused for operations. The reason is that neither one is looking for it and do not avail themselves of an intelligent use of the uterine sound. When the sound passes through the ring without resistance the condition is not suspected; when it encounters resistance the difficulty is attributed to faulty development or ante flexion. The dilatation intended for the relief of the supposed defect sometimes relieves most of the symptoms for a short time and the patient is pronounced cured of what she did not have. But the symptoms either return shortly or the original condition persists in a slightly ameliorated form.

The diagnosis, made by means of the sound, is confirmed by the results of the treatment, viz., by the disappearance of the physical signs and the relief of subjective symptoms, such as backache, headache, reflex stomach disturbances, malaise, dysmenorrhea, menorrhagia, intermenstrual pain and sterility. The number and severity of the symptoms vary greatly in different cases, depending in part upon the interference with the lumen, the chronicity and associated pelvic conditions, and partly upon the patient's general resisting powers and nervous habits. Some patients do not complain of many symptoms, yet chronic inflammation in this location produces more subjective symptoms than in any other part of the uterus. Its symptoms are often attributed to a corporeal endometritis when such does not really exist.

In all cases of chronic cervical endometritis or supposed corporeal endometritis, we should search for induration about the internal os. The first and most noticeable sign in all but the most chronic cases, is pain produced by a slight pressure of the sound. When the os is anatomically small or is flattened by flexion, the pressure is not painful until it causes some dilatation or straightening, or at least until firm pressure is made. When the sound is passed through an inflammatory constriction with slight pressure, its withdrawal is followed by a show of blood at the internal os or by a stain of blood on the sound. In stenosis or under-development, not due to or connected with inflammation, it requires not only firm pressure but some forcible dilatation to produce a show of blood. That the tenderness is primarily at the internal os, and not due to a general intrauterine tenderness, is known by the cessation of the pain almost as soon as the bulbous end of the sound has passed the internal os, even though the sound be manipulated so as to impinge gently against the uterine walls above. When the constriction does not interfere with the passage of the sound, a little gentle manipulation can be made to locate the tender area at the internal os. The constriction ring seldom produces an abrupt and decided projection on the surface and the sound may feel as if it slipped over the edge of the thickened mucous membrane into the somewhat more spacious uterine cavity above. When the ordinary uterine sound thus passes without encountering resistance, a series of



graded sounds that taper slightly at the end are required both for diagnosis and treatment. In passing such a sound large enough to dilate slightly we produce the diagnostic pain and show of blood already mentioned. In very chronic cases moderate pressure may not produce the show of blood, in its place a lump of inspissated mucus, expressed from the glands, may be found adherent to the sound.

The ring of exudate can in some cases be traced by the uterine sound around the entire circumference; in others a part of the circumference will have no ridge but is flat, smooth, and of a cicatricial hardness indicating partial or complete local destruction of the mucosa. Dr. Byford recently had a case of bilateral deep laceration of the cervix in which by separating the labia he could see the smooth, red cicatricial flat surface posteriorly and the elevated ridge anteriorly. Both have been already recognized by means of the sound. The lateral lacerations were quite deep and probably the flat cicatricial surface represented the site of one or more superficial lacerations at the internal os which had not united.

In two cases the slight dilatation produced by the passage of the uterine sound caused the patients to faint when they got off the examining table. In several cases the patients have turned pale and dizzy, and have had to lie down or take a drink of water or go to an open window to avoid syncope. This would probably have occurred oftener but for the fact that many of them remained on the examining table long enough for the effect of the local irritation produced by the examination to wear off. This symptom is found more often in cases with old, well organized exudates. Painful dilatation of a small, comparatively healthy cervix may cause nausea and a feeling of faintness.

Treatment calls, first of all, for dilatation. Stimulating applications before any dilatation has been effected are not always borne well and sometimes aggravate the condition. Gradual progressive dilatation is preferred to extreme divulsion at one sitting. The latter is apt to produce one or more lacerations that extend through the constriction ring so that farther dilatation separates the lacerated edges of the ring without having much effect upon the exudate. Subsequent contraction takes place, requiring one or more subsequent divulsions, unless it is kept from contracting by the periodic passage of sounds the same as for progressive dilatation. The repeated mild stimulation of progressive dilatation with graded round dilators not only causes a steady improvement, but it more often cures the sterility which is the result of the presence of the inflammatory exudate rather than of mechanical obstruction.

When the patient cannot or will not stand the pain of progressive dilatation, the first one or two may be done under the influence of nitrous oxide gas. However, these dilatations are not carried far enough to cause lacerations and depend as much as possible upon the subsequent periodic use of the round dilators. A very slight increase in the amount of dilatation at each sitting is all that is necessary. This is done twice a week in such cases; once a week in those who can endure more at a time.

Before dilating, the vaginal vault and cervix is swabbed thoroughly with a 5 per cent solution of phenol; followed by a 20 per cent solution of phenol in glycerin to the entire uterine cavity. When a round dilator equal in size to a No. 25 urethral dilator French scale, can be passed without causing a show of blood or producing much pain, a stimulating solution of iodized phenol is applied to the entire cervical cavity and dilatation done twice a month for a few times and then once a month until the parts are in a fairly healthy condition. In cases with a large lumen the same treatment is used except that it is begun and ended with large dilators.

#### DISCUSSION

DR. ARTHUR H. CURTIS, CHICAGO.—I believe Dr. Byford wishes to especially emphasize the inflammatory constrictions near the internal os. My experience during the last fifteen or eighteen months has revealed a surprising number of strictures and granulations of the cervix. There is no question that these are an important factor in the production and persistence of a chronic discharge. However, irrespective of how careful one is in performing these dilatations, if one removes the normal constriction which nature has

placed at the internal os, there is likelihood of causing infection, not only of the uterus, but the Fallopian tubes.

I hope those of you who do follow out Dr. Byford's suggestions to do away with granulations and strictures will not dilate too frequently.

DR. HERMAN J. BOLDT, NEW YORK CITY.—Probably in recent years more attention has been paid to surgical gynecology than to minor gynecology, as we find it in office work.

The condition which Dr. Byford has spoken of has not been considered by me to be of an inflammatory character; but a mild degree of constriction is often found about the os internum and in the majority of cases dysmenorrhea is associated with it. As I remarked before, surgical intervention has played such a prominent part that the minor procedures have been lost sight of. The condition noted can be combated with a remedy that was thrown into the waste-basket long ago, namely, the intrauterine use of the galvanic current. You pass a sound on the same principle that it is used in genito-urinary work for strictures of the urethra without forcible dilatation. Using an electrode and a current of two milliamperes, with the negative pole in the cervical canal, continuing the current for ten minutes, that particular class of cases can be relieved. The 10 per cent phenol that Dr. Byford uses is usually a sufficient antiseptic. I believe this peculiar condition can be relieved more effectively by the method I have mentioned than by any other surgical intervention.

DR. ROBERT L. DICKINSON, BROOKLYN, NEW YORK.—The question whether this constriction at the internal os is pathologic or not, hinges very often, as far as the symptomatology is concerned, on whether metritis is or is not present. There may be a tiny opening with no symptoms whatever, but if the narrowing is connected with either a persistent or recurrent spasm, or a considerable localized metritis, an aggravated form of dysmenorrhea results.

What are the specific tests by which this condition can be determined? We have learned that some antelexions and some of the worst cases of spasm of the internal os disappear entirely under complete anesthesia. There is no evidence of what we thought we were going to find when we got the patient on the operating table. A case of dysmenorrhea in which we expected to find a very marked antelexion and narrowing at the internal os under the anesthetic was found to be simply a spasm. Sometimes I think the only way to make a diagnosis is by the use of an anesthetic. However that may be, a neglected procedure is to determine by the sound whether there is an area of excessive sensitiveness at the internal os which, when touched with the tip of the sound, produces a typical dysmenorrheic pain for which the woman comes to you. We have then two tests.

A third test is as follows: Take a Goodell or graduated dilator and dilate such a tender, narrow internal os, and the patient is free from dysmenorrhea for one, two or three months, and then it returns. Not having treated her in the meantime, again you do a dilatation, and again she is relieved of pain, and she comes back at stated intervals asking for that relief. That is as good proof as we ever can get of the value of the treatment. In other words, there are three tests of the question of an inflammatory or spasmodic or contracted internal os, or one around which there is an area of marked metritis, the test of complete relaxation under anesthesia; the test of extreme sensitiveness producing dysmenorrheic pain, and the test of a very mild office dilatation, carried on under antiseptic precautions which completely relieves the symptoms. I believe a large proportion of these persistent cases have a localized metritis around the internal os.

DR. THOMAS WATTS EDEN, LONDON, ENGLAND.—I should like to ask Dr. Byford whether he has any pathologic evidence bearing on this condition; whether he has had an opportunity to examine uteri showing this wall of cervical contraction. One must feel a little hesitation in concluding that we have a definite pathologic condition until we have been able to confirm it by direct pathologic observation.

DR. BYFORD (closing the discussion).—I have not taken out the uterus for this condition and therefore cannot demonstrate its pathologic character. The exudate in the

cervical endometrium is merely a little thicker at the internal os, where reparative processes are interfered with by a small lumen or by small lacerations and cicatrization. This extra thickness of the mucosa at the internal os would probably not attract attention in a specimen unless suspected.

Dr. Curtis warns us against too much dilatation. I have advised in my paper against wide dilatation. When I put patients under anesthetic I do not dilate widely for fear of producing small lacerations. If no laceration of tissue has been produced there is no danger of making the internal os permanently too large. It always contracts. I have these patients come once a month for two or three months to see that it does not contract too much. Except in those multiparæ in whom we have a large os due to lacerations during labor, I have not done any injury that kept the internal os patulous.

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DR. REUBEN PETERSON, Ann Arbor, Mich., read a paper entitled **Errors in Gynecologic Diagnosis Due to Misplaced Organs.** (For original article see page 170.)

#### DISCUSSION

DR. GEORGE GELLHORN, ST. LOUIS, MISSOURI.—I am prepared to confess the following mistakes. This case concerns a multipara, thirty-seven years of age, who presented herself with symptoms of acute peritonitis. A large tumor was found in the lower right quadrant of the abdomen intimately connected with the uterus and I made a diagnosis of ovarian tumor with twisted pedicle. The diagnosis was not quite as clear as I would like to have had it because of the configuration of the tumor and its consistency, but that was the best I could do. On operation I found an enormous malarial spleen which not only traversed the entire abdomen downward into the right half and had become firmly incarcerated between the uterus and the right pelvic wall, but it turned a complete somersault, so that the upper pole of the spleen was in the depths of the culdesac, while its tail was in the region of the appendix.

DR. JOSEPH BRETTAUER, NEW YORK CITY.—We have all made mistakes in diagnosis. Sometimes they were justifiable and sometimes they were due to lack of proper appreciation of the symptoms or to carelessness. There are, however, instances where in spite of the utmost care we are not able to make a correct diagnosis. I am thinking at present of a very old case of mine and also of a recent one.

Some twenty years ago I had reason to believe that I had to deal with either an ovarian cyst with a long twisted pedicle, a tubo-ovarian cyst or hydrosalpinx. On opening the abdomen I found an adenocarcinoma of the ascending colon, with a very long mesocolon, which was just as movable as if it had arisen from the adnexa. There were no symptoms whatever from the intestinal tract. I resected a large portion of the intestine and the woman is still well.

A counterpart of this case is one I operated on two weeks ago. While my diagnosis was not certain, the probability as to the existing condition, in my mind, was one of two things, an atrophic adherent fibroid or a malignant condition of the appendages. The woman had passed the climacteric; she had a mass in the pelvis which was tightly adherent and intimately connected with the uterus. There were no signs whatever of involvement of the intestinal tract. I made a rectal examination digitally and with a proctoscope. On opening the abdomen I found the mass I had felt was the lower part of the sigmoid so tightly adherent to the posterior wall of the uterus that it could not possibly be separated from the uterus. After tying off both broad ligaments and cutting through the vagina, I lifted the uterus and sigmoid out of the abdominal wound, resected the sigmoid, made a lateral anastomosis. The specimen presented an enormous angular adenocarcinoma of the sigmoid.

DR. HENRY T. BYFORD, CHICAGO.—I should like to call attention to an interesting kind of tumor sometimes found in the culdesac of Douglas during pregnancy. I have two cases in mind. One of the most eminent surgeons in this city wanted me to operate on his wife



for a tumor in the culdesac. I told him to let the tumor alone and she would come through pregnancy all right. She did. Another doctor had discovered a tumor in the culdesac of a pregnant woman and wanted me to operate. I declined to do so, and she had no trouble from it. The mass was the prolapsed omentum in both cases. My attention was first called to this condition by a mistake in diagnosis. I diagnosed a tumor in the culdesac, I cut through the posterior vaginal vault and came upon the omentum. As there were no adhesions or other pelvic pathology I let it alone.

DR. N. SPROAT HEANEY, CHICAGO.—I had a case similar to the one which Dr. Peterson reports, of a tube prolapsing through the vaginal vault after hysterectomy. I did a vaginal hysterectomy, leaving the tubes and ovaries. The patient made an uneventful recovery but returned in a few weeks complaining of a very profuse leucorrhea. In my office, upon the introduction of a speculum into the vault of the vagina, I saw a granulomatous projection which I thought I might remove. Upon seizing it with tissue forceps, however, preparatory to snipping it off, the tube came out into the vagina. I removed the patient to the hospital and was able, under full surgical anesthesia, to enlarge the opening in the vaginal vault sufficiently to allow the complete escape of the tube, and by ligating the blood supply, was able to remove it without further incident.

I do not know how else I could have arrived at the diagnosis because I was quite unfamiliar with such a possibility.

DR. HIRAM N. VINEBERG, NEW YORK CITY.—A point I wish to emphasize is that an ectopic kidney is usually a single kidney and when one comes across a misplaced kidney one ought to be careful, if it is displaced and gives rise to trouble, before removing the kidney of making certain of the presence of another kidney. This can be readily done by exploring with the hand through the abdominal incision.

DR. CHARLES G. CHILD, JR., NEW YORK CITY, described, in discussing the paper, a case of wandering spleen adherent in the pelvis mistaken for recurrent carcinoma.

Mrs. A. G., 21 years of age; para I, with a difficult instrumental delivery two years ago, was operated upon July 15, 1905, dilatation, curettage and repair of the cervix. The abdomen was then opened by a transverse suprapubic incision. The adnexa of both sides were freed from adhesions, a left pyosalpinx removed, and the right tube resected for chronic salpingitis. Uterus replaced; round ligaments shortened. The pathologic report on the cervical tissue removed was carcinoma. On July 22, a vaginal panhysterectomy was performed. The convalescence from both of these operations was uneventful, and there was a marked general improvement of the patient's condition during the following year.

In October, 1907, she complained of considerable loss in weight, with pain in the pelvis, more particularly on the left side. Examination at this time showed nothing abnormal in the pelvis. She was again seen in December, complaining of an aggravation of all symptoms to which were added marked gastrointestinal disturbance. Examination showed considerable tenderness of the vaginal vault with marked induration and thickening around the broad ligament stump on the left side. Bimanual examination gave the impression of a recurrent growth in this region. The patient had grown progressively weaker since the examination in October and there had been a very marked loss in weight. No cachexia was apparent and she did not look as though she were suffering from a malignant process, notwithstanding the fact that all the clinical findings seemed to point toward a recurrent growth. On December 6, 1907, a median line incision was made and beyond some few large intestinal adhesions in the pelvis at the site of the previous operation, no evidence of any recurrent growth was found. A large and congested spleen lay in the left side of the pelvis, slightly adherent to the broad ligament stump. The splenic vessels formed a pedicle measuring nine inches in length. No evidence of a splenic mesentery was found. The adherent spleen, which was felt by bimanual examination, was what had been taken to be a recurrence of the original growth in the cervix. The spleen was freed from adhesions, an incision made at and parallel to, the free border of the ribs on the left side. The peritoneum was separated from the fascia, making a pocket into which the spleen was transferred, and then sutured behind the spleen, leaving only a small opening for the splenic vessels. The fascia and skin were then closed; modified Bardenheir's technic.

The patient made an uneventful convalescence, was entirely relieved of the abdomino-pelvic pain of which she complained before the operation, made a rapid gain in weight, and has been perfectly well up to date. The spleen has remained in its new extraperitoneal situation without causing any symptoms, and six months after the operation it had returned to practically normal size.

DR. PETERSON (closing the discussion).—Dr. Brettauer has nothing on his conscience. He made use of all methods of diagnosis, yet the preoperative diagnosis was not made. That was not the point of my paper. My paper was written because I thought it was well to point out the need of a more careful examination in all these pelvic conditions and to utilize all accepted methods before operation. We will make mistakes in diagnosis because we are human, but there are many new methods of diagnosis being perfected at the present time which will make our diagnoses more accurate. Among these may be mentioned x-ray examinations after gas injections of the peritoneal cavity. If we exhaust all methods and put ourselves clearly on record as to the preoperative diagnosis and then check up with the operation and the autopsy, it will be of great advantage. For instance, representatives from the American College of Surgeons in going around and investigating different hospitals found it comparatively rare for a diagnosis to be made and recorded prior to operation. My paper has served its purpose if it has shown the necessity of careful examination and diagnosis in all our cases.

*(To be continued in the December issue.)*

# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### Recent Literature on Eclampsia\*

(A Critical Review)

BY HUGO EHRENFEST, M.D., F.A.C.S., ST. LOUIS, MO.

A STUDY of the obstetrical literature of the past few years reveals the surprising but very evident fact that the war has actually stimulated the interest of the investigator in the etiology, and of the practitioner in the successful treatment of eclampsia.

As early as 1916, Warnekros<sup>1</sup> emphasizes the fact that practically all large maternity services of Germany and Austria have noticed a material decrease in the number of their eclamptic patients. In most instances the statistical record of this fact is accompanied by some explanation which for obvious reasons deals with the etiology of this disease. Thus Mayer<sup>2</sup> speaks of a general toxic effect of sperma resorption which occurs in the course of pregnancy when sexual relations continue without interruption under normal conditions. A corresponding benefit, therefore, is derived from the absence of the husband in war service. This hypothesis evidently has not met with much favor. It is extensively discussed by numerous writers and almost without exception repudiated. Warnekros, who also deals with this hypothesis in detail, states that the majority of writers seem to regard as more acceptable an explanation offered by Ruge<sup>3</sup> which ascribes this reduction in the number of eclampsia patients to the marked deficiency of the war diet in fats, and especially in proteins. But many objections are raised also against Ruge's theory. Mayer asks: "How can this explanation be made to harmonize with the indisputable increase of nephritis during the war also ascribed to food conditions?" Franz,<sup>4</sup> answers that "war nephritis" is the result of the many epidemics of infectious diseases which have swept through Europe. A Gynecologist, serving in the Austrian army, enters the discussion by offering statistical proof that the soldier, physically exhausted and persistently exposed to colds, is likely to develop a nephritis merely from the toxicosis caused by the various prophylactic vaccinations. Therefore, the evident frequency of war nephritis has no bearing on the eclampsia problem. Gessner<sup>5</sup> thinks that the seeming benefit of the war conditions to the pregnant woman in protecting her against eclampsia, is entirely due to the prevention of overeating in combination with the advantage of increased physical activity forced on her by war conditions. Zangemeister<sup>6</sup> doubts both the feasibility and possibility of establishing, by statistics, the relation of the changed food conditions to eclampsia, and feels satisfied from his own studies that this apparent decrease of eclampsia is almost proportionate to the decrease in the birth rate. With that sagacity, so often noticeable in his controversial papers, Lichtenstein<sup>7</sup>

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\*Based on a paper read at the meeting of the American Gynecological Society, May 24-26, 1920.



discusses, and finally repudiates, all these theories and explanations. An analysis of the eclampsia cases, treated in the large German maternities before the war, shows that a considerable number of them had been brought from distant places. The inefficient, at times completely interrupted, railroad service, the absence of all automobiles, the notorious inadequacy of ambulance service for the civilian population and the crowded condition of all hospitals, necessarily prevented many eclamptic women from being admitted to hospital wards. To this probably large number of patients unable to reach the clinics must be added another group which now is kept out of hospitals by the attending physicians. The insistent teaching of obstetricians during the past decade that forced delivery by no means is the only method of dealing with eclampsia, that the conservative treatment is useful and indeed preferable in many instances, is fortunately beginning to bear fruit. The practitioner has finally learned the technic of the Stroganoff therapy which can be carried out adequately in the home of the patient. Also after the return of normal conditions, Lichtenstein expects the larger clinics to see fewer eclamptics than before the war.

Ruge<sup>8</sup> and others contribute elaborate papers on the question of the etiologic importance of defective liver function, first suggested by Dienst. This theory in some of the papers is likewise linked to the problem of changed food conditions during the war. Schickele<sup>9</sup> objects, because most careful metabolic studies fail to reveal any disturbance of liver function during pregnancy. Pathologic tissue changes in the liver, varying in character and extent, indeed, are found in all severer forms of pregnancy toxemia. However, they are not the cause but only the result of the intoxication, and appear coincident with similar changes in other organs, e. g., the kidneys. To a similar conclusion comes Dahlmann<sup>10</sup> when he finds, by animal experiments, that even an extensive mechanical impairment of the liver does not prevent the organ from responding satisfactorily to the increased demands made upon it by pregnancy. In this connection mention may be made of an observation, not unique but rare, of a severe peritoneal hemorrhage from the liver in an eclamptic patient, reported by Herz.<sup>11</sup> Bory<sup>12</sup> advances a novel hypothesis: Eclampsia is caused by a functional deficiency of the placenta which permits fetal toxins to pass into the maternal circulation unmodified. Two very exhaustive studies seem to dispose of the older conception that eclampsia represents an anaphylactic condition. Eisenreich<sup>13</sup> bases his objection on a series of animal experiments and a comparative study of complements in the blood of women, pregnant or in labor. Zinsser<sup>14</sup> concludes that eclampsia cannot be an anaphylactic shock because it is not a toxemia brought on by the destruction of proteins. Yet, Bruett and Schumm<sup>15</sup> emphasize that the eclampsia virus quite frequently reveals a marked tendency to destroy blood cells. In eclampsia the blood serum shows an increase of hematin proportionate to the severity of the intoxication. It is impossible to say whether these blood changes are due to placental toxins, or should be explained as an anaphylactic phenomenon. Certain clinical findings, which seem analogous to those of serum hemoglobinuria, in their opinion, speak rather in favor of an anaphylactic process.

The acidosis theory of eclampsia has been considerably weakened by the investigations of Slemons.<sup>16</sup> He finds in the blood in eclampsia and allied intoxications during pregnancy a normal quantity of amino acids and a slight retention of nitrogenous waste products, usually an unimportant augmentation of cholesterol and a reduction of lecithin. He concludes, that, in general, these studies do not support either the hypothesis of acidosis or one of a derangement of the protein metabolism. Emge<sup>17</sup> ascertains that the

acidosis of a toxemia of pregnancy, as a rule, is only equal to the acidosis of normal pregnancy.

The corpus luteum is considered the source of the eclampsia toxin by Westermarck.<sup>18</sup> He is so thoroughly convinced of the scientific justification of this view, that he actually proceeds to carry out the only logical treatment in accord with this theory: Elimination of the toxins already in the organism by venesection and prompt emptying of the uterus; and prevention of further resorption of toxins by the removal of the corpus luteum. He performed this operation in seven cases, twice simultaneously with a Cesarean section, and claims to be entirely satisfied with the results so far obtained. Although hyperemesis represents a toxemia of early pregnancy and eclampsia one of the later stage of gestation, Westermarck's theory cannot fail to remind one of Hirst's<sup>19</sup> recent claim that hyperemesis is the result of lacking corpus luteum function. He assumes that the increase in the size of the corpus luteum during the first three months of pregnancy indicates that none of its secretions are resorbed. It would be out of place to discuss here Hirst's theory in the light of certain physiologic facts, or its relation to the probable importance of corpus luteum function in the implantation of the fertilized ovum, but the fact is worthy of emphasis, that Westermarck seemingly cures eclampsia by removing the corpus luteum, and Hirst apparently relieves hyperemesis by injection of corpus luteum extract. The theory of one or of both, of necessity, must seem wrong.

Zangemeister<sup>20</sup> reiterates his contention that the eclamptic convulsions are caused by an abnormal intracranial pressure, the result of an acute edema of the brain, which in turn is brought on by the increased general blood pressure. Proper eclampsia treatment, therefore, must attack, prophylactically, the cerebral edema by reducing, therapeutically, the high blood pressure. Entirely in accord with this theory seem the observations of Kirstein.<sup>21</sup> He finds that the pressure of the intraspinal fluid remains at the normal level during normal pregnancy, but is markedly increased in eclampsia, proving the existence of an abnormal intracranial pressure. The convulsion is released by a further augmentation of the already abnormal blood pressure, which during the convulsion causes an added rise in the intracranial pressure.

As stated above, the development of a new theory concerning the causation of eclampsia almost without exception is linked with the proposal of a new, more rational form of treatment. Therefore, it is not possible, however desirable, to group in this survey the references to literature under the distinct headings of etiology and therapy. For similar reasons also the literature dealing with symptomatology and diagnosis will have to be considered, at least in part, in connection with newer suggestions of therapeutic measures especially of a prophylactic nature.

A thorough critical analysis of eclampsia therapy leads Ruge<sup>3</sup> to the following deduction: Notwithstanding all therapeutic efforts a certain and unfortunately not a small number of eclampsia patients will die. Irreparable damage to life-sustaining organs, such as kidney or liver, is already done when the symptoms first become manifest and the treatment begins. But also fatal secondary derangements in lungs and heart cannot always be avoided successfully. In these respects better results can be hoped for only by better prophylactic care, when physicians more carefully than heretofore will watch for all suspicious prodromal symptoms of the toxemia. Appropriate measures, which include bed rest, diet, the administrations of alkalis, and prophylactic venesection, must be instituted early, and when nevertheless the symptoms tend to become more aggravated, not too much time should be lost in inducing labor. Dice,<sup>22</sup> in a discussion of the indications for interference in preeclamptic toxemia, lays particular stress on the importance and value of an examination of the eyeground. It is the belief of Cauwenberghe<sup>23</sup>



that not enough attention is paid to gastric symptoms, pain in the epigastrium and vomiting, as premonitory signs. That there are occasional exceptions to the almost invariable rule of a rise in blood pressure, and that this important symptom might be absent in eclampsia, is incidentally mentioned by Danforth.<sup>24</sup> The true index of the preeclamptic state, called by him eclampsism, according to Pacheco,<sup>25</sup> is a characteristic change in the specific gravity and in the chloride contents of the urine. He also describes distinct changes in the sphygmographic records. In the prophylactic treatment of cases of eclampsism he employs an exclusive milk diet, allowing some water only in extreme cases. Injections of a sugar solution prove useful in reducing the concentration of the urine and promoting diuresis. For the purpose of reducing the blood pressure and of eliminating toxins he performs venesections, two and three times a month, withdrawing never more than from 100 to 120 grams of blood at a time. Diuretics should be accompanied by a total or partial restriction of salt. No meat shall be allowed.

In view of the advocacy even of repeated venesections in the preeclamptic state, mentioned in preceding quotations, it seems interesting to state that occasionally serious objection is raised against its employment. In a plea for an eclampsia therapy which would entail the least amount of shock and trauma, Cragin<sup>26</sup> says: Eclampsia patients after convulsions resemble so closely patients in shock, that venesection seems illogical. They seem to need all the blood they have and more too. Abandonment of phlebotomy by Cragin apparently has not interfered with his results. For the reduction of the blood pressure he prefers *veratrum viride*.

In regard to the problem of a specific treatment of eclampsia mention must be made of an article by Villanueva<sup>27</sup> in which he describes most satisfactory results in 12 cases with intravenous injection of a sodium bicarbonate solution. He bases his therapy on the assumption that eclampsia is due to acidosis, a theory greatly weakened, if not entirely exploded, by recent work quoted in the foregoing pages.

Unsatisfactory results with thyroid medication are ascribed by Percy<sup>28</sup> to the obvious insufficiency of the small dose customarily administered. He gives a daily dose of 50 grains of the dried gland for one or two weeks in urgent cases, and a correspondingly smaller dose, between 12 and 20 grains daily, for less severe cases.

Considering finally the general attitude of recent writers in regard to an active or conservative mode of therapy for women actually seized with eclamptic convulsions, we meet at least with two writers who cannot find any advantage in temporizing measures. Lapthorn Smith<sup>29</sup> very emphatically proclaims that after a convulsion has occurred one should not give chloroform, chloral, or *veratrum viride*, or employ venesection. *Accouchement forcé*, vaginal Cesarean section or craniotomy then are not any longer justifiable, while abdominal Cesarean section always is the one safest operation in surgery. If possible, still more radical seems Poucher<sup>30</sup> who says: "When a patient, at or near term, in spite of all means of elimination, shows by nervousness, sleeplessness, severe headaches, high blood pressure, edema, and excessive albuminuria that convulsions are imminent, why wait until the patient has become eclamptic? A severe preeclamptic toxemia case should never be allowed to suffer hard or prolonged labor pains. In primiparæ, who represent 75 per cent or more of eclamptic women, abdominal Cesarean section, done with ether or gas-ether anesthesia, offers by far the best results."

Undeniably, however, more prevalent among modern writers is the tendency to advocate conservatism. Carefully analyzing his own work from the viewpoint of the respective advantages and disadvantages of conservative and radical methods in the practice of obstetrics, Austin Flint<sup>31</sup> concludes that, in general, probably more favorable results, both for mother and child, could



be expected from more conservatism in obstetric therapy. In regard to eclampsia in particular, he is convinced that in a large proportion of cases the actual development of the disease could be prevented by an earlier recognition of toxic conditions in pregnancy. Asa B. Davis<sup>32</sup> emphasizes that at least in some cases the active treatment will hasten the end of a patient in a hopeless condition though the child might be rescued. Unfortunately, however, these children on account of prematurity and their intoxication show a very high mortality. When Ross McPherson<sup>33</sup> makes an urgent plea for the conservative treatment of eclampsia (a slightly modified Stroganoff treatment with venesection), he expresses, by way of an introduction, his fear that his suggestion might "bring on his head a storm of adverse criticism and disbelief at the present time when the radical operative methods are almost universally in vogue and are preached and practiced so consistently by the majority of obstetricians throughout the world." From a confirmed radical he had changed "to what some may call an overconservative." McPherson's fear seems unjustified. Mention has been made of Lichtenstein's explanation of the decrease of eclampsia patients in the maternity hospitals as in part due to the persistent teaching of more conservatism in its treatment. Winter<sup>34</sup> in a large monograph discusses exhaustively eclampsia treatment in all its known forms, and then asserts that in future the discussion cannot any longer deal with the old problem of "operative versus conservative" therapy. This question now is definitely settled. Both methods are firmly established and both have their respective definite fields, and at times are advantageously combined in the treatment of the same patient.

It seems that there is one point often overlooked in scientific discussions of eclampsia therapy, although it is of paramount importance to the practitioner of medicine. Radical operative measures yield entirely satisfactory results only in the hospital practice. Certain conservative methods, on the other hand, have proved satisfactory both in the hospital and in the home. At the present time, and probably also in the future, the overwhelming majority of all obstetric patients must be managed in the home. It, therefore, remains the indisputable duty of scientific obstetrics to improve primarily the conservative methods of treatment because they will benefit the greatest number of patients. Though obviously incomplete and necessarily concise, the numerous quotations from recent eclampsia literature, offered in this survey, seem to justify the following general deductions: The question of the etiology of eclampsia is still unsolved. The therapy of eclampsia seems to tend towards more conservatism. No new specific treatment has been discovered. The importance of early diagnosis and of early prophylactic treatment of the preeclamptic state is generally appreciated.

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## Selected Abstracts

### Urinary Bladder after Operations

**Laroque: Gauze Sponge Expelled from Urinary Bladder.** Journal American Medical Association, 1919, lxxii, 218.

Patient presented a history of a laparotomy performed some time ago, at which the appendix and left ovary were removed and the uterus suspended. No drainage was employed. She was perfectly well, when suddenly seized with agonizing bladder tenesmus, and spasmodic incontinence, expelling urine which contained a large amount of foul-smelling pus. Roentgen examination for stone negative. Temperature varied between normal and 101° F. On bimanual examination a small mass was felt in right fornix. During an attempt to catheterize the patient a piece of gauze was discovered in the urethra. This was pulled out and proved to be a surgical sponge, about two by ten inches. Symptoms subsided immediately and patient was well within a week.

**Stoeckel: Entrance of Gauze Sponge into Bladder after Prolapse Operation.** Zeitschrift für Gynäkologische Urologie, iv, 38.

While the passing of sponges and even of small instruments into the bladder after laparotomies has been recorded repeatedly, this occurrence after vaginal operations seems rather rare.

The patient was referred to Stoeckel after long continued local treatment of a severe cystitis by another physician. A cystoscopic examination, finally made, easily revealed the presence of a large stone in the bladder. Stoeckel suspected a ligature stone. He suggested a cystotomy but was forced by the patient first to try a lithotripsy. The stone seemed to yield, pieces broke off and then it became obvious that the nucleus of the large concretion was formed by a softer mass. Grasping it firmly with the lithotripter he pulled about 4 cm. of a gauze strip through the urethra when further progress was made impossible by the retained portion of the concretion. Though he knew that the patient had been operated for a prolapse he decided to open the bladder through the vagina. A long longitudinal incision in the anterior vaginal wall failed to expose the bladder wall as expected. The operation performed on the patient had been a Schauta-Wertheim uterine interposition. Thus he was forced to free the entire uterus from its bed before he was able to reach the bladder. Through an incision he finally extracted the entire sponge with its adherent concretions. He closed the bladder with two layers of catgut sutures, and reinforced the closed incision by replacing the uterus into its forced anteposition. Convalescence was prompt and the patient was discharged well two and a half weeks later. The writer emphasizes in this connection the necessity of obtaining, in the interposition operation, a perfect approximation between the transferred bladder and the posterior uterine wall, because the uterus lying in front prevents the escape of any material, even of blood, from the remaining pocket.

**Hirschberg: Unusual Location of Ligature Stones in the Female Bladder.** Zeitschrift für Gynäkologische Urologie, iv, 100.

Bladder stones are notoriously rarer in women than in men. Both the genuine urinary calculi and those forming over foreign bodies introduced through the urethra (comparatively common) obviously lie as a rule on the floor of the bladder. In contradistinction, ligature stones often are found attached to the bladder wall. This special group of stones by some writers



is divided into primary stones forming around ligatures placed into the bladder wall itself, and secondary stones forming around ligatures which have migrated into the bladder cavity from more distant places. Among the ligature stones those of the secondary type are seen less often. The noteworthy feature of the case recorded by Hirschberg was a secondary stone between bladder and anterior fornix so that it was more a "vaginal" than a bladder stone. This patient had been operated through the vagina for a left-sided tubal pregnancy. Bladder difficulties had begun soon after the operation. The simple removal of the stone, size of a cherry, with scissors and dissecting forceps from the vagina led to the formation of a small fistula which closed promptly with disappearance of all symptoms. This patient had been subjected to useless local treatments for a long time, though a vaginal examination easily would have lead to the correct diagnosis.

**Curtis: The Bladder of Women after Operation.** American Journal of Obstetrics, 1918, lxxvii, 230.

In this paper is furnished final statistical proof for the correctness of certain contentions expressed by the writer in a preliminary report presented two years previously. With added experience in the management of 465 operated cases he now formulates the following conclusions and therapeutic suggestions: Both in disease and in experimental work, when virulent bacteria pass through a normal bladder, they do not tend to infect the mucous membrane. Similarly, when catheterization is performed for conditions other than relief of retained urine, subsequent infection is a rarity. On the contrary, cystitis, which develops after catheterization to relieve a distended bladder, occurs despite the utmost care. Retention of urine, therefore, is the most important factor in the development of postoperative cystitis. Cystitis seldom occurs from cleanly and careful catheterization of a healthy, physiologically normal bladder.

All patients who complain of distress are catheterized, distention must be avoided. Whenever there is doubt that the patient is actually able to completely empty the bladder, the catheter is introduced to ascertain the possible presence of residual urine. Even in doubtful cases catheterization is preferable to a possible stasis of urine. While it is admittedly preferable to dispense with the catheter, decidedly better results are obtained when the catheter is passed without the slightest hesitation to prevent overdistention or incomplete emptying of the bladder.

Curtis states that his own investigations only confirm almost identical observations and deductions made some years ago by Taussig. The general adoption of this rational prophylaxis against postoperative cystitis seems to encounter unusual difficulties through the well established fear of nurses (and physicians!) of producing a cystitis by catheterization. In the light of these newer investigations the "catheter cystitis" is not a result of *commission* but rather of *omission*.

**Esch: Postoperative Cystitis.** Archiv für Gynäkologie, 1919, ex, 659.

The known greater liability of cystitis after operations in the female than in the male is chiefly due to the fact that unfortunately in many of the gynecologic operations it becomes necessary to separate the bladder more or less extensively from its surrounding tissues. Traumatism to blood vessels and nerves then often leads to parietic conditions of the bladder wall. The patient is either unable to void at all, or to empty the bladder completely. This incomplete ischuria, as pointed out by Bumm, is one of the chief factors in the development of the cystitis, the residual urine forming a suitable



culture medium for the germs, unavoidably introduced with the catheterization. Some writers for this reason have pleaded for keeping a retention catheter in the bladder for several days in all patients unable to empty the bladder completely. In Esch's opinion the customary preoperative diet also represents an important additional factor in the causation of the cystitis. A reduction in the normal acidity of the urine diminishes its ability to inhibit bacterial growth. Esch strongly advises to continue the customary practice of avoiding, as long as possible, the introduction of a catheter, and to follow each catheterization with an antiseptic bladder lavage. He advocates the use of urinary disinfectants by mouth, and states that the treatment of the postoperative cystitis in general is identical with the customary treatment for cystitis. These conclusions are based on a very thorough study of the bacteriology and chemistry of the urine in cystitis, and the effect of certain urinary antiseptics.

**Broun and Rawls: Cystoscopic Study of End-Results of Cystocele Operations.** Surgery, Gynecology and Obstetrics, 1918, xxvi, 502.

The writers studied the interior of the urinary bladder of 49 patients on whom hysterectomies, interposition and trisection operations for procidentias, and also abdominal operations had been performed. In striking contrast to the fact that the very large majority of patients stated that they had been entirely or in part relieved by the operation from previous urinary symptoms, were the cystoscopic findings. The bladder base exhibited a normal appearance only in nine of the cases. In all the others, even the widely distended bladder showed convolutions and sulci. It seemed that the character of the operation performed did not influence to any marked degree the extent of such permanent folds. While not causing any noteworthy disturbance, the writers consider them objectionable, at least theoretically, as the result of a cystocele operation. They conclude from their investigations that a free separation of the bladder from the mucosa and fascia will enable the operator to coapt the fascial pillars with the minimum amount of puckering of the overlying bladder wall.

**Lindeman: Chronic Trigonitis in the Female.** Surgery, Gynecology and Obstetrics, 1920, xxx, 64.

"Irritable bladder" in women may be due both to extrinsic and intrinsic causes. Among the extrinsic causes may be mentioned pressure by the gravid uterus, and uterine, ovarian, or pelvic newgrowths; distortion by extravesical tumors; displacement by cystocele and prolapse and, following interposition operations; congestion from a similar general pelvic process due to inflammation, pregnancy, etc. Among the intrinsic causes may be mentioned cystitis, newgrowths, foreign bodies including calculi, etc. In the past, an irritable bladder with no gross findings in the urine, was usually diagnosed a "bladder neurosis." Bladder symptoms due to nervous diseases, however, are usually of a different type: dribbling, loss of control and retention, rarely irritability. Careful cystoscopic examination of these irritable bladders reveals definite changes in the trigone as the chief pathologic feature, and to this group of cases Lindeman applies the term cystitis colli or trigonitis. The exact cause of this condition is not known. The onset of the disease is usually insidious with gradually increasing frequency of urination, usually without pain. When the condition becomes aggravated (it is usually chronic and progressive) the desire to urinate becomes almost constant.

For the treatment of this disease the writer recommends the following entirely new method: By means of a special needle attached to a Brown-

Buerger cystoscope, injections are made into the tissue of the trigone. The fluid employed for the purpose is a 2 to 2½ per cent solution of quinine and urea hydrochloride in sterile normal saline. The results, he asserts, have been most encouraging; there have been no failures and no bad results. Details of the rather difficult technic of this method are given in the paper.

### ERRATA, OCTOBER ISSUE

In the article of DeLee, page 34, paragraph 1, the concluding sentence should read: As regards the pain, the rapid spread of the twilight sleep craze will show the demand for painless labor, and also that "tokophobia" is spreading among women.

Page 36, seventh line from bottom, insert "and" after "injuries."

Page 38, sixth line from bottom, should read "levator ani" instead of "levator and fascia."

Page 43, paragraph 5, second line, should read, "the physical labor of a prolonged second stage."

Page 44, line 7, insert "the" before "general."

Article of Dr. Watkins, page 92, paragraph 4, line 2, should read: "the wound has healed in from 25 to 50 per cent less time than when I used more radical treatment."

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## Original Communications

### MICROSCOPICAL STUDIES OF TUBAL PREGNANCY\*

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WE find many conflicting statements in medical literature about the microscopic appearance of the pregnant tube. Among investigators, however, there is not much difference of opinion. The varying statements are due to a perpetuation by noninvestigators of errors made by earlier observers without a careful scrutiny of the literature for more recent investigations.

It is with the hope of clarifying some of these supposed controversial points that this material is presented. It occurred to the writer some years ago when he began collecting this material that it might be of advantage to section the tubes longitudinally rather than by the usual cross section.

The advantages of this method were conceived to be: first, in serial section studies of the whole tube there would be fewer slides (there proved to be 300 to 700 longitudinal sections and 2000 to 4000 cross sections); second, that the tubes being cut from the uterine to the fimbriated end a better opportunity for naked eye or hand glass study might be offered, showing on one slide in the central sections of each tube the condition and relations of all parts of the tube to the ovum.

### IMPLANTATION OF THE OVUM

Inasmuch as the uterus and tubes are genetically identical and therefore composed of the same tissues, we might well expect the same reaction of the uterine and tubal elements to a pregnancy. Careful observations demonstrate that the physiologic scheme is followed exactly in both uterus and tube; in the latter, however, the results are pathologic from the beginning because the ovum is implanted in an organ entirely unfitted anatomically for its reception

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or development. We find in tubal pregnancy the analogues of everything occurring in an intrauterine gestation, but never the identical thing itself because of anatomic and histologic differences of the two organs, i. e., the processes are the same but the results inevitably different.



Fig. 1.—Photograph of longitudinal section of tubal pregnancy showing relations of ovum to tube; basalis (serotina) with riddled tube wall beneath it, capsularis (reflexa) distended by hemorrhage, the angles of capsularis with tube wall particularly distinct, embryonic vesicle bounded by chorion, amnion with contained embryo, hypertrophied tube wall near basalis and then distended tube wall.

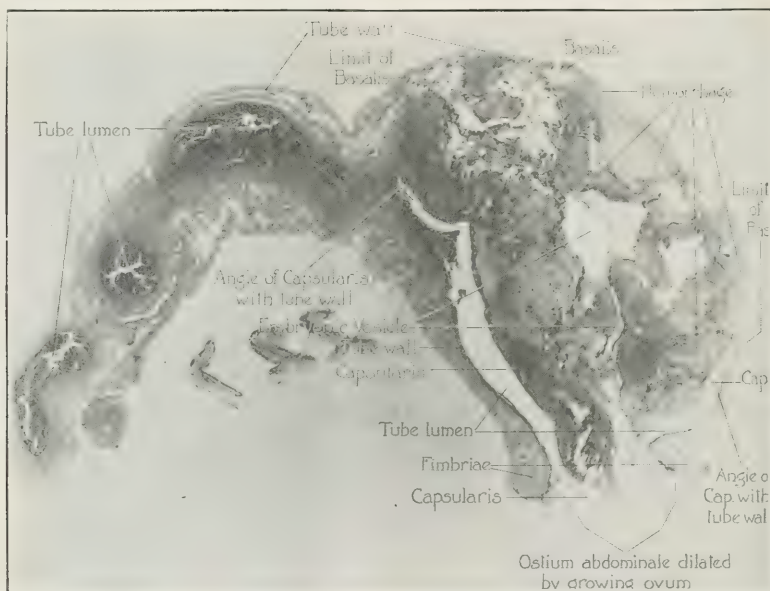


Fig. 2.—Photograph of longitudinal section of pregnant tube showing implantation near fimbriated end of tube; ovum bulging through end of tube by growth of embryo through ostium abdominale and not by tubal abortion.

Implantation occurs in exactly the same manner in both uterus and tubes; the ovum burrows into the mucous membrane in each instance, but from the moment of entrance, it meets different conditions and its further history is determined by them.

#### DECIDUA

In the uterus the fertilized ovum finds a mucous membrane whose stroma, either because of the greater thickness or because of specialization, is capable of developing into decidua thick enough to harbor the ovum, protect the muscle of the uterus from the erosive action of the trophoblast, and extensive and loose enough to form the decidua capsularis.

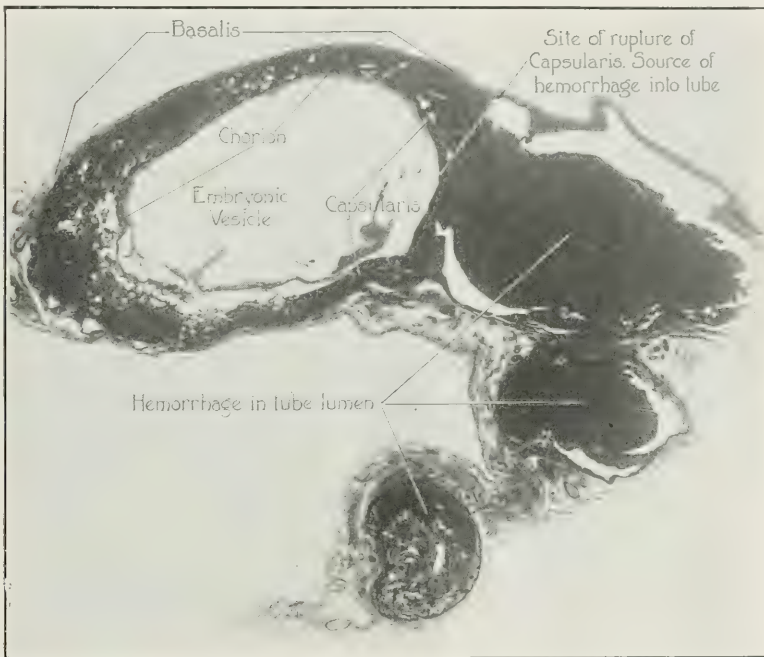


Fig. 3.—Photograph of longitudinal section of tubal pregnancy showing rupture of capsularis (inner ovum capsule) with resultant hemorrhage into tube lumen due to inner rupture not to tubal abortion.

In the tube, on the other hand, there is a scant connective tissue stroma (or specialization of the tissue is lacking) and we find no true decidua, although "decidual reaction" can be demonstrated.

In the uterus the decidua because of its important function might well be called an organ; in the tube we find no such organ but decidual cells are discernible throughout the mucous membrane of the tube either as isolated cells or in groups, but never as true decidua.

#### BASALIS

There has been more controversy about the presence of decidual cells in the basalis than in any other portion of the tube; some observers contending that they have never found them and others that they were always found in

abundance. This difference of opinion arises from two things; first, that decidual cells are indeed, in all cases, very scarce, requiring prolonged search. Often in serial sections they will be demonstrable only in very few slides. In this small series they have always been found but in some specimens only after laborious hunting through numerous serial sections. One cannot say there are no such cells unless he has examined every slide of serial sections of the whole tube. Second, those who claim that decidual cells are found in abundance in the basalis, are probably making the same mistake that the earlier observers made, namely, misinterpretation of trophoblast cells as decidual cells. When these cells are isolated or in groups not showing direct connection with trophoblast masses (Fig. 12), it is easy to mistake them for decidual cells. However, their trophoblastic origin can be demonstrated in slides where the

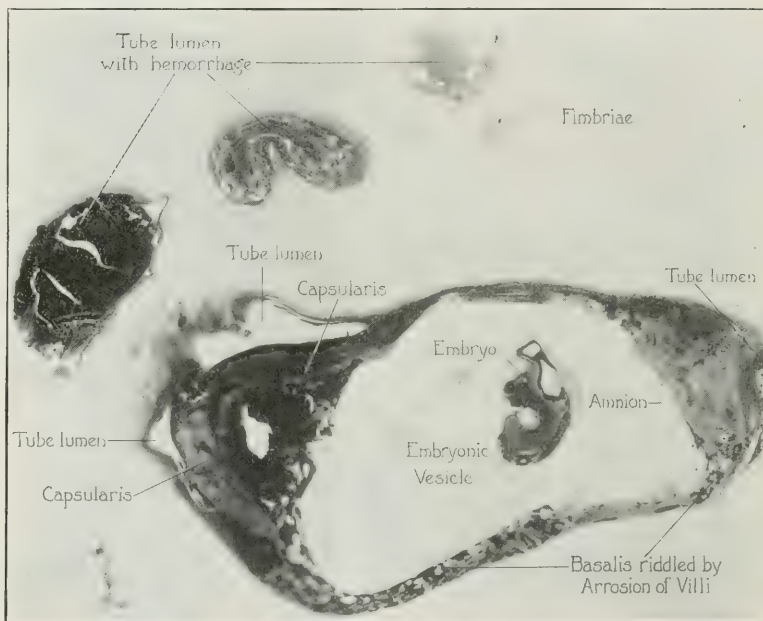


Fig. 4.—Photograph of longitudinal section of tubal pregnancy showing hemorrhage into tube lumen due to rupture of capsularis, also shows embryo in tube.

undoubted deeply stained trophoblastic mass is in direct continuation with the less deeply stained but evidently identical cells (Fig. 22).

Even though decidual cells may be found in the area usually called decidua basalis, true decidua is never present, hence we cannot, in truth, speak of decidua basalis in tubal gestation. We have the analogue but not the thing itself, therefore, for want of a better term it will simply be called "basalis." (Figs. 1, 2, 3, and 4.)

Inasmuch as there is no decidua in the basalis or what little there might have been, having been destroyed in the erosive action of the trophoblast, the ovum almost immediately after penetrating the mucous membrane comes into contact with the inner muscular layer of the tube, continues its arrosive action



on the muscle in its attempt to fasten itself and seek blood supply, thus, literally riddling the muscle and weakening the wall.

Fig. 22 shows the muscle layer in process of destruction by the trophoblast and Fig. 5 shows the villi anchored directly into the musculature of the wall and arroding it.

In the uterus the thick decidua basalis protects the muscle wall from such attack and furthermore furnishes ample area for the excavation of the sinuses or lacunæ by the trophoblast within the decidua. The vessels in the uterine

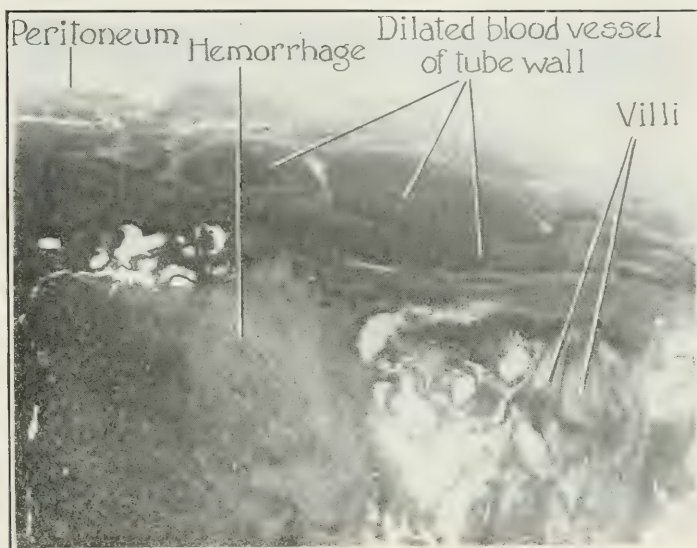


Fig. 5.—Photomicrograph showing large dilated blood vessels of tube wall, anchoring villi and hemorrhage (not an orderly circulation) into intervillous spaces.

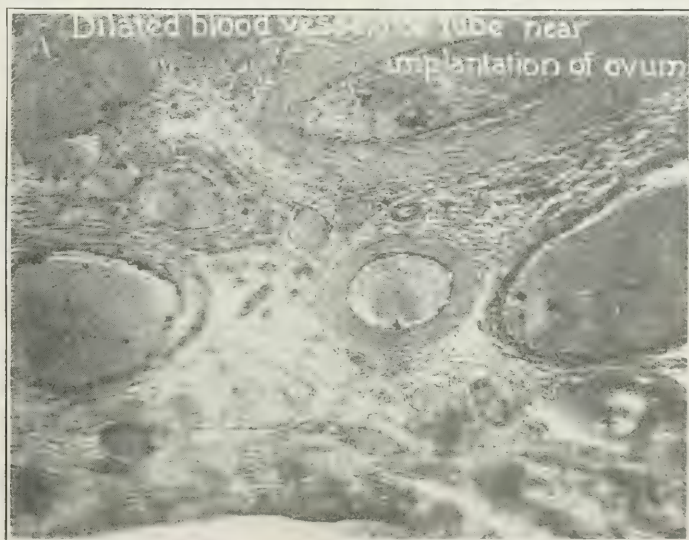


Fig. 6.—Photomicrograph showing dilated vessels of tube wall.

decidua basalis arroded to furnish the blood to the lacunæ are very small, causing not a hemorrhage but a normal blood supply to the intervillous spaces, while in the tube this protecting decidua being absent, the muscle is attacked, and the vessels arroded are much larger, thus causing a hemorrhage instead of a normal blood supply into the intervillous spaces.

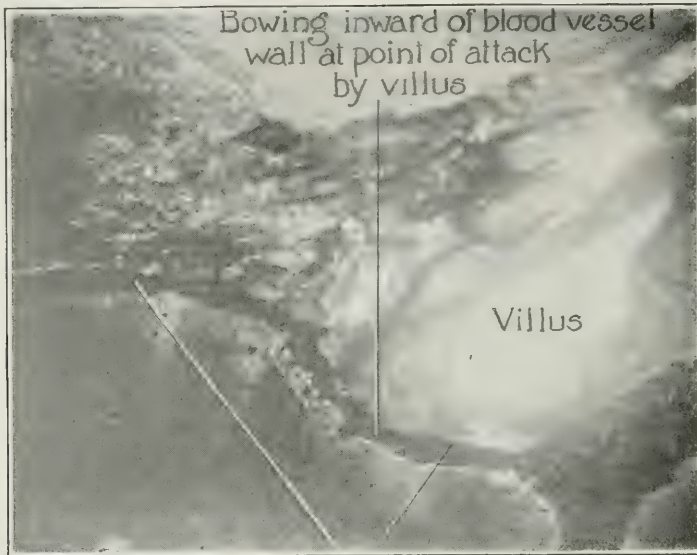


Fig. 7.—Photomicrograph showing vessel wall bending inward as if the villus attacking it were exerting mechanical pressure.

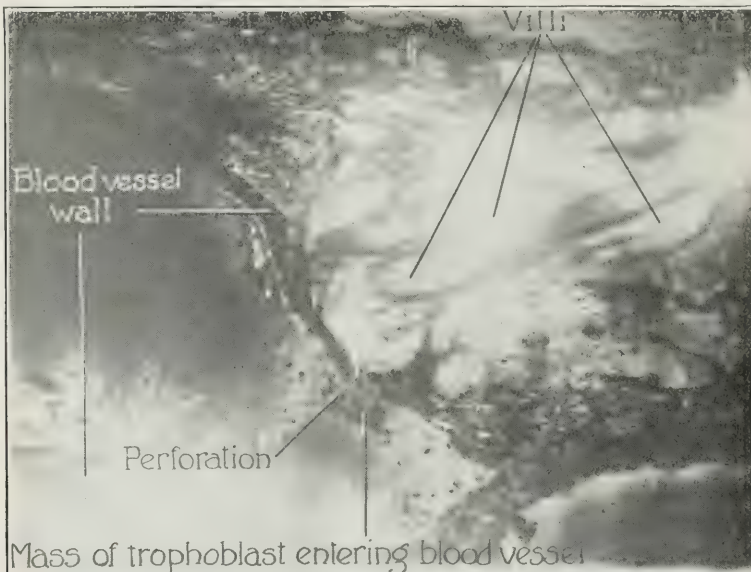


Fig. 8.—Photomicrograph showing villus in the act of arroding the vessel wall, mass of trophoblastic cells within the vessel just having completed the perforation.

The blood vessels of both the uterus and tube are dilated in the region of the implantation of the ovum, but in the uterus they are protected from the destructive action of the trophoblast by the presence of the decidua basalis so that only the smaller vessels in the decidua itself are attacked. In the tube on the other hand on account of the absence of the decidua the unprotected dilated vessels in the musculature are eroded causing a hemorrhage in the intervillous spaces instead of a normal blood supply. This hemorrhage is



Fig. 9.—Photomicrograph showing cross sections of villi entirely within a vessel of the tube wall.

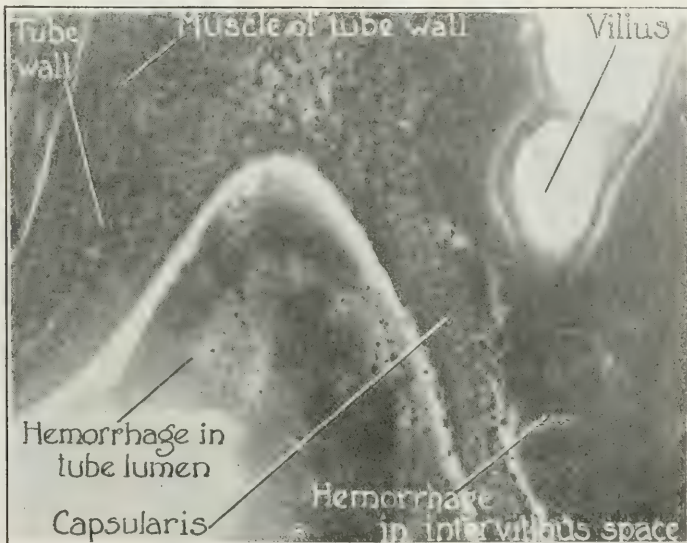


Fig. 10.—Photomicrograph showing angle of reflection of capsularis (reflexa) from tube wall, also hemorrhage in intervillous space and tubal lumen.



sometimes so profuse that the villi are displaced and crushed together and the ovum capsule is distended beyond its ability to resist and the blood bursts through into the tube lumen.

Figs. 5, 6 and 16 show the dilated vessels of the pregnant Fallopian tube in the region of the implantation.

Figs. 5, 7 and 16 show villi close to the walls of the large blood vessels;



Fig. 11.—Photomicrograph showing angle of capsularis (reflexa) with tube wall and hemorrhage in intervillous spaces



Fig. 12.—Photomicrograph showing more or less scattered trophoblastic cells frequently mistaken for decidual cells.

Fig. 18 shows the villi in the act of penetrating the vessel walls. In Figs. 8 and 18 the penetration is completed and in Figs. 14, 15 and 18 the blood flow between the vessels and intervillous spaces is completely established.

When we note the size of the vessels in Figs. 5, 6, 8, 14, 16 and 18 which may be or have been perforated by the erosive trophoblast or villi, it is very easy to understand why we see so much hemorrhage into the intervillous

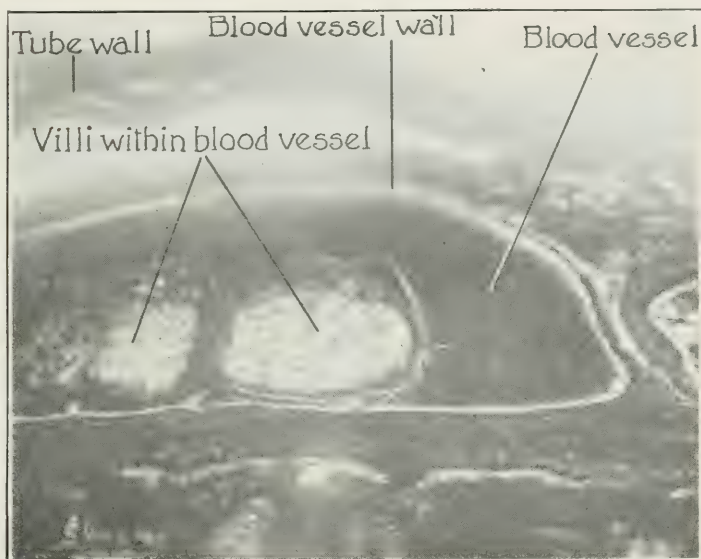


Fig. 13.—Photomicrograph (retouched) showing cross section of two large villi entirely within blood vessels of tube wall.

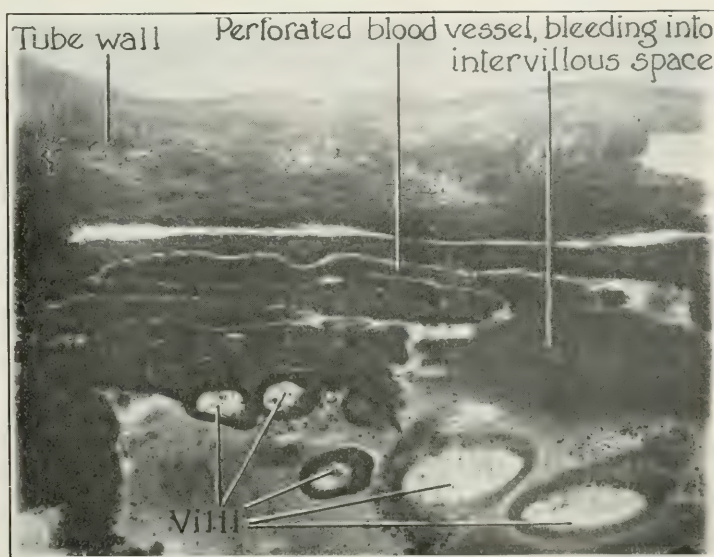


Fig. 14.—Photomicrograph (retouched) showing hemorrhage pouring from eroded blood vessel of tube wall into intervillous space.

spaces, capsularis and tube lumen. Figs. 8 and 15 show the villi distorted and crushed together by the excessive amount of blood in the intervillous spaces and Fig. 20 shows such an amount of hemorrhage that we see scarcely anything but blood, which is so excessive that it has flattened the embryonic sac so that it looks like a tube.

Webster said that in all the pregnant tubes he had examined he had never seen a capsularis without hemorrhage. The writer believes that hemorrhage is the rule.

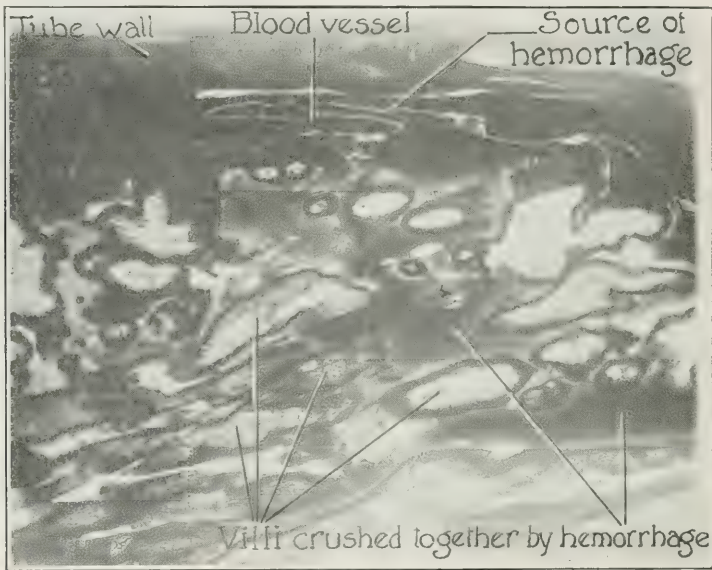


Fig. 15.—Photomicrograph (retouched) showing how the large hemorrhage of the vessel shown in Fig. 14 is crushing the villi together and destroying their normal relations to each other and to the tube wall.

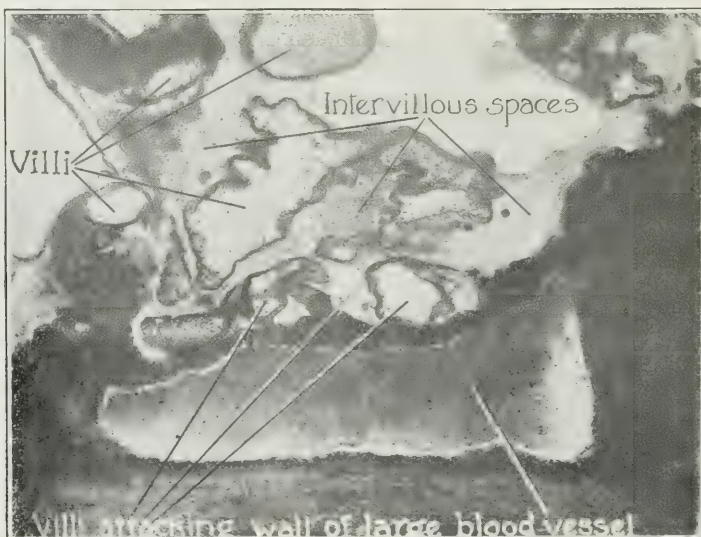


Fig. 16.—Photomicrograph showing very large vessel being attacked by villi.



Figs. 5, 8, 10, 11, 13, 14 and 15 show the excessive amount of blood in the intervillous spaces and Figs. 19 and 24 show the same condition in the capsularis, while Figs. 10 and 24 show the blood free in the tube lumen, having burst through the capsularis.

#### CAPSULARIS

The earlier writers said little about finding a decidua capsularis (reflexa) but von Winkel in 1871 described an ovum with a reflexa (capsularis) and Werth in 1887 described one with a maternal enveloping layer corresponding to the decidua capsularis and he was the first to describe it histologically. Zedal and many others confirmed Werth's findings, but here again the early errors appear in some writings although investigators are in substantial agreement that

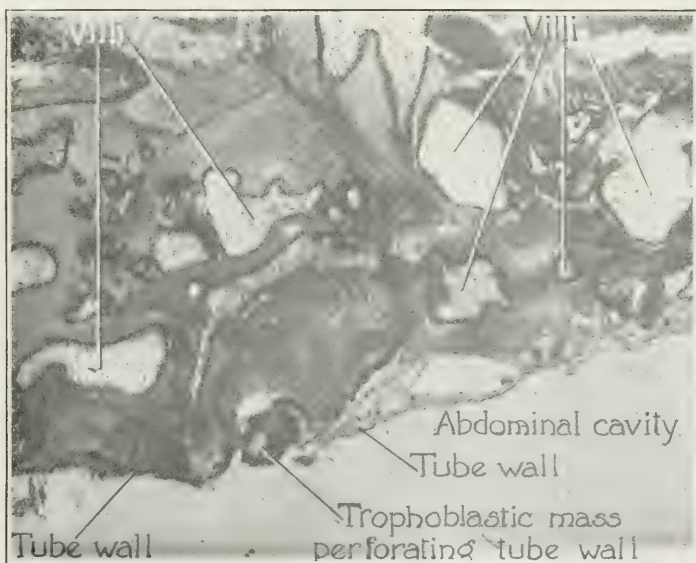


Fig. 17.—Photomicrograph showing several villi attacking tube wall and the trophoblastic cells of one having completely perforated the wall.

there is in tubal pregnancy an analogue of the decidua capsularis of intrauterine pregnancy, but here as in the basalis there is no true decidua although decidual cells and cell groups are frequently found. The writer has found them more frequently in the capsularis than in the basalis in spite of the fact that hemorrhage is universally present in the capsularis masking the cell elements.

That there is a capsularis which is the analogue of the decidua capsularis of the uterus is shown in Figs. 1, 10, 11, 19, and 24.

Mucous membrane and tube folds and other wall tissue can be demonstrated on the ovum mound projecting into the tube lumen, proving conclusively that it is truly "capsularis" notwithstanding the fact that there is so little decidual reaction that we cannot call it "decidua capsularis."

This "inner ovum capsule," as it has been well called, is inherently weak, does not expand and grow with the ovum as does the true decidua, and it is also further weakened by eroding villi just as is the tube wall, hence it ruptures easily. (Figs. 3, 4 and 24.)

## DECIDUAL FORMATION IN OTHER PARTS OF THE TUBE

It really seems that the farther away from the site of implantation we get the more decidual reaction we find. We see it in distant parts of the tube, in the fimbria (Fig. 23), in the peritoneum of the tube and it has been observed even in the opposite nonpregnant tube.

## MUSCULARIS TUBÆ

Werth noted thickening of the muscle of the tube outside the implantation area. This has been observed also in this series (Fig. 1); however, it is not a constant finding and has been seen only in the neighborhood of the implantation. The muscle in other parts of the tube is not greatly modified except where it is put upon the stretch by the growing ovum. (Figs. 1, 3 and 4.)



Fig. 18.—Photomicrograph showing perforation in vessel wall caused by erosive action of villi.

## RUPTURE AND ABORTION

It is usually stated that ectopic gestation is terminated by "tubal rupture" or "tubal abortion." This statement is only approximately correct for the reason that the condition called "tubal abortion" is not strictly speaking an abortion, analogous to a uterine abortion, i.e., a separation of the ovum from its attachment and extrusion by the activity of the musculature of the tube. Separation does sometimes occur and the ovum may be found free in the tube lumen, but that this is the rule in the so-called tubal abortion or that the tube has power to expel the separated ovum, is very doubtful.

The fact that the ovum of an extra-uterine pregnancy is frequently found protruding through the ostium abdominale of the tube is not usually due to an expulsion of a separated ovum by the tube, but is generally due to the fact that in

such cases the implantation of the ovum has occurred near the fimbriated extremity. The ovum is protruding, not because it is separated and being expelled, but because it is pushing through the end of the tube by virtue of its own growth and enlargement. This slowly dilates the abdominal opening of the tube and the ovum is not separated from the original site of implantation. This is illustrated by Fig. 2, in which the ovum is seen implanted near the ostium abdominale, is not separated or ruptured, but is protruding from the end and

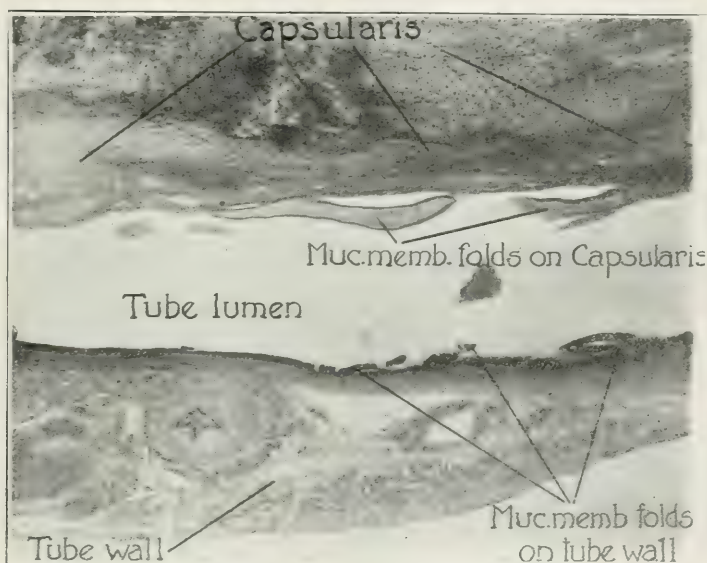


Fig. 19.—Photomicrograph showing tube wall and capsularis opposite covered by tubal mucous membrane proving conclusively the existence of a capsularis (reflexa) in tubal pregnancy.



Fig. 20.—Photomicrograph showing hemorrhage in capsularis which is so massive that it has flattened the embryonic vessel so that it looks like a tube.



dilating the opening by its own increase in size. By strict interpretation of terms this could hardly be called an abortion.

Of course, in this particular specimen, there is a tremendous intraovular hemorrhage and the embryo is pathologic. The embryonic sac was compressed by the hemorrhage into the tube-like body (Figs. 2 and 20) but by looking at this picture it seems logical to assume that in a case where the ovum did not perish it could continue its growth through the end of the tube, retain its attachment to the original site of implantation, increase the placental

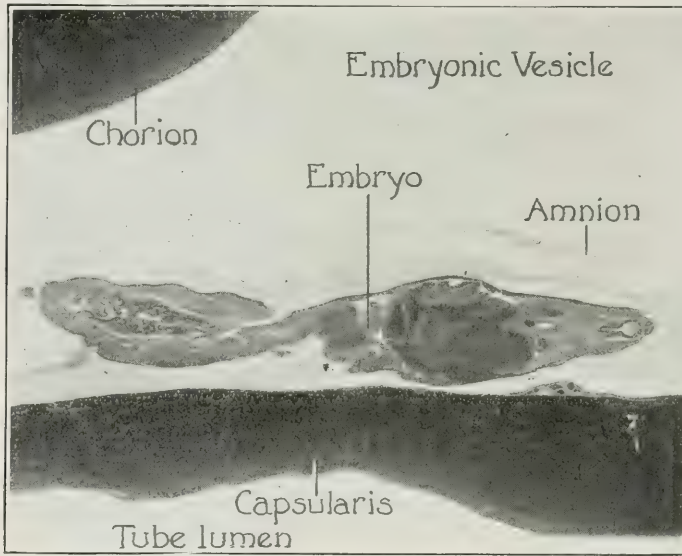


Fig. 21.—Photomicrograph showing details of embryo.

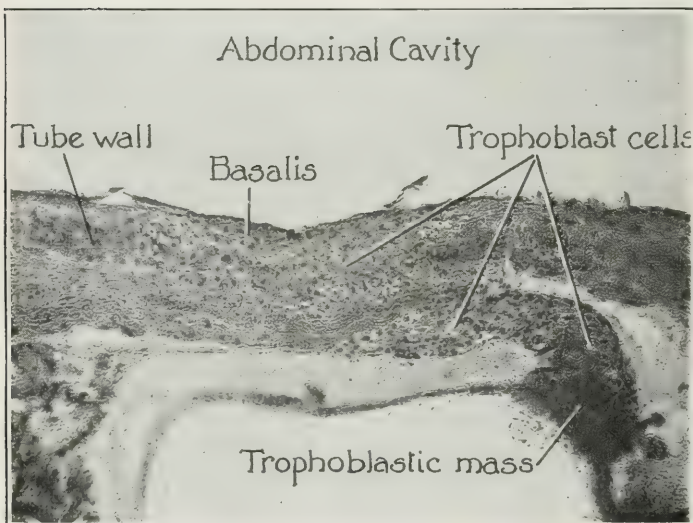


Fig. 22.—Photomicrograph showing dense trophoblastic cell mass gradually fading out to isolated cells which are often mistaken for decidual cells.

area in the same manner as in the uterus, extending simply by continuity over the surface of the broad ligament and adjacent pelvic structures and an abdominal pregnancy result. It is the writer's opinion that this is a logical explanation of some cases of abdominal pregnancy, for he cannot believe that such a condition can occur by reattachment of a separated ovum. Moreover, it seems rather doubtful that an abdominal pregnancy can follow a rupture through the tube wall and there is doubt that an ovum can primarily implant itself in the peritoneum.

If the implantation is nearer the uterine end of the tube the termination will be either "external rupture" of the ovum capsule through the tube wall into the abdominal cavity or "internal rupture" through the inner ovum capsule into the tube lumen or, rarely, separation of the ovum, in which case it perishes and may become a tube mole or it may be pushed along toward the

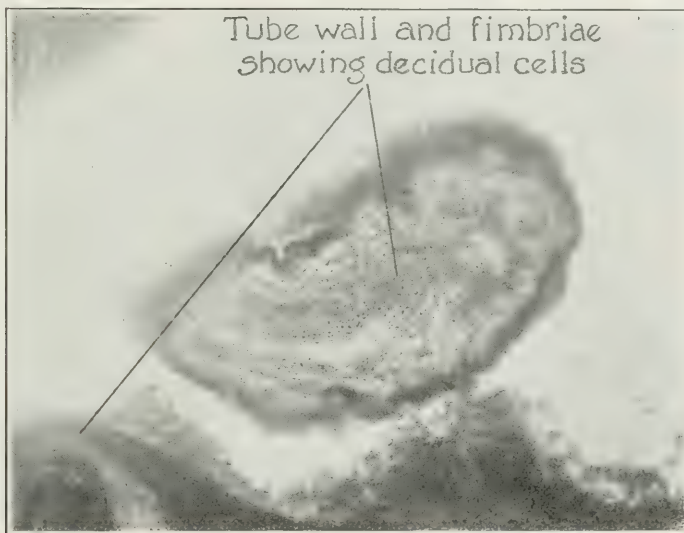


Fig. 23.—Photomicrograph of fimbriated fold showing decidual cells, illustrating the fact that the farther we get from the site of implantation, the more decidual reaction is found.

fimbriated end by the hemorrhage but not by the tube muscle. True abortion is rare in the writer's opinion. "Internal rupture" is a better term than "tubal abortion" for, although in a great majority of so-called unruptured tubes, hemorrhage into the tube and from the ostium abdominale is the rule, it is not always due to separation of the ovum, as in uterine abortion. On the contrary it is more often due to a rupture of the internal ovum capsule caused by distention of the ovum capsule by the hemorrhage explained above and by a weakening of the capsularis by the erosive action of the villi. Fig. 1 shows the capsularis distended with blood and Fig. 3 shows the rupture of the capsularis or internal capsule and the blood escaping into the tube lumen and flowing toward the fimbriated end. In all of these illustrations the ovum is not separated from the tube wall.

"External rupture" may be either a true bursting of the weakened arroded tube wall under pressure from within, due to the growth of the ovum or distention by hemorrhage, or it may be only an arrosion by villi, the wound being very small and yet it may terminate fatally because a large vessel has been opened.

Fig. 17 shows trophoblastic mass having perforated the tube wall and Fig. 1, 2, 3, and 4 show how the tubal wall has been "riddled" and weakened by the erosive action of the villi.

It is easy to understand how such a weakened wall can rupture. Werth observed that when trophoblastic masses or villi come in contact with the vessel which it is to perforate there is a bowing inward of the wall toward the lumen of the vessel just as if it were under mechanical pressure. This is well

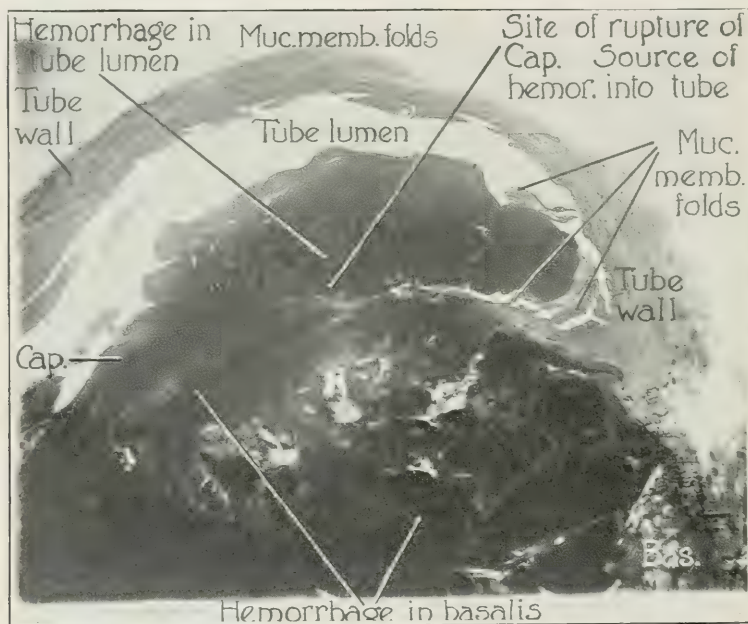


Fig. 24.—Photomicrograph showing angle between tube wall and capsularis (reflexa), mucous membrane of tube wall reflected for some distance on capsularis; shows also massive hemorrhage into intervillous spaces site of rupture of capsularis (internal ovum capsule) and hemorrhage through rupture into tube lumen.

shown in Fig. 7. Not only are masses of trophoblastic cells seen just within the vessel wall after perforation (Fig. 8) but sometimes larger masses or even whole villi are observed in the vessel, perhaps having been swept in by the blood stream from the intervillous spaces. Figs. 9 and 13 show cross sections of villi entirely within the vessel.

Time will not permit detailed description of the embryos found in this series, therefore, I will without discussion call your attention to Figs. 1, 4, 20 and 21 in which the embryos are shown *in situ*.

In conclusion, without attempting to enumerate the specific points, it may be said that every physiologic process occurring in intrauterine pregnancy is repeated in tubal gestation but from the moment after the ovum has penetrated the mucous membrane of the tube every detail is pathologic.



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DONALDSON BUILDING

(For discussion, see p. 302.)

## HEMORRHAGES INTO THE PELVIC CAVITY OTHER THAN THOSE OF ECTOPIC PREGNANCY\*

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THAT ectopic pregnancy is the most frequent cause of hemorrhage into the pelvic cavity is a well-established fact. That there may be, however, other causes for such hemorrhage is something which every surgeon of wide experience has had occasion to learn. A considerable literature likewise affords testimony to the same. An experience with a case of hemorrhage from a ruptured Graafian follicle and several instances in which blood was found in the pelvic cavity, have led me to seek further enlightenment from the literature. It is the result of this investigation that I shall attempt to sum up for you. First, however, I wish to cite the case referred to.

A. L., single, aged twenty-four, gave the following history: As an infant she had rickets and did not walk until she was three and a half years old. From that time on she was robust until four years ago, at which time she had some acute illness of uncertain nature, lasting a week, during which she lost many pounds in weight. She has been below par physically since that time. During the past two years she has had occasional attacks of vomiting (usually one or two hours after eating), lasting altogether from one to three weeks. Shortly after the illness mentioned above she had an attack of pain and soreness in the right side, which lasted about a week. Two years later a similar attack.

Present attack began six hours before operation, with severe acute abdominal pain, which radiated through to the rectum. This pain was so severe that she was "all doubled up" as she expressed it, and perspired freely. The acute attack lasted about an hour and then gradually eased off. She was seen about two hours after the onset. There was some tenderness over the lower abdomen, with the principal point low down on the right side. There was no distinct rigidity but the cutaneous reflex was absent in the right lower quadrant. By rectal examination great tenderness was found in the right culdesac. Pulse and temperature were not disturbed. With the history of previous attacks and the present history and findings, a diagnosis of acute appendicitis was made, and operation advised.

On opening the abdomen through an appendiceal incision a small amount of sanguinous-fluid escaped. The appendix, which we had supposed was directed down into the pelvis, lay to the outer side of the cecum, extending well up toward the kidney. It was kinked and bound down by adhesions, but there was no sign of recent trouble. It was freed and removed. Further examination revealed blood coming from the pelvis. Since a more thorough examination was necessary, a median incision was made and the pelvis examined. The uterus was normal in size and position. Both tubes and the left ovary were normal. The right ovary was as large as a walnut and presented a ruptured Graafian follicle the size of a hickory nut, which had evidently been the source of the bleeding. There were about two or three ounces of fresh blood. The follicle was dissected from the ovary and the edges united. Patient made a good recovery.

Dr. Warthin (pathologist) of Ann Arbor reported that the specimen "shows only a normal hemorrhagic follicle, with early development of the corpus luteum,

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nothing pathologic. We have had similar cases thought to be ectopic and showing nothing more."

Dr. Warthin in further correspondence says that since 1895 he has had five similar cases in the diagnostic service of the Pathologic Laboratory of the University of Michigan. Complete histories of the cases were not then available, but in all the condition has been thought to be ectopic gestation. Two of these women were unmarried, had exposed themselves to the danger of conception; in the other cases there was also a fear of pregnancy. The patients were all young women, one or two periods had been missed, there was nervous excitement and worry, and then symptoms suggesting ectopic pregnancy. Large, apparently normal hemorrhagic follicles were found, with amounts of blood varying from several teaspoonfuls to several tablespoonfuls in the cavity. Histologic examination showed no evidences of pregnancy. Dr. Warthin's experience with the condition is interesting as showing the relative rareness of the condition and the suggestion that mental excitement and worry may sometimes have some relation to it.

The number of such cases found in the literature is a considerable one. Cases very similar to mine are reported by Adams,<sup>1</sup> Bartelo,<sup>3</sup> Bender, and Marcel,<sup>5</sup> Benthin,<sup>6</sup> Bertkrau,<sup>7</sup> Bonneau,<sup>11</sup> Bookman,<sup>10</sup> Boveé,<sup>8</sup> Cranwell,<sup>13</sup> Edgard,<sup>15</sup> Engstrom,<sup>16</sup> Forssner,<sup>18</sup> Hind,<sup>21</sup> Kober,<sup>23</sup> Ladinski,<sup>25</sup> Lee,<sup>26</sup> Lockyear,<sup>29</sup> Luken,<sup>30</sup> Novak,<sup>34</sup> Ohman,<sup>36</sup> Pfeilsticker,<sup>37</sup> Primrose,<sup>39</sup> Roll,<sup>40</sup> Romme,<sup>41</sup> Simonds,<sup>44</sup> Tartansen,<sup>45</sup> Taylor,<sup>46</sup> and Winiwarter.<sup>52</sup>

Dr. F. C. Warnshuis has kindly furnished me with the report of a case of this kind coming under his observation.

M. K., school girl, aged fourteen, had had the usual diseases of childhood but no serious illnesses. Menstruation beginning at the age of twelve, had been regular, occurring every 28 to 30 days, and in every way normal. She was a well-developed girl and had the appearance of seventeen years. Her present illness began November 27, 1913. While at school she stated that she had cramps in the abdomen. She came home complaining of abdominal pain and nausea. After reaching home she vomited. Her symptoms increased and Dr. Warnshuis saw her about nine-thirty that night in consultation.

The abdomen was everywhere tender, but extremely so in the right lower quadrant, and there was slight distention. By the rectum a great deal of pain was elicited by pressure in the right culdesac, and there was a certain amount of bogginess. There was a very slight bloody discharge. Temperature 98° F., pulse 110. A clinical diagnosis of acute appendicitis was made, but because of having had a somewhat similar case two weeks before (see bibliography) a ruptured Graafian follicle was thought of. Operation was advised and carried out that night.

Right rectus incision. On opening the peritoneum blood was discovered in considerable quantities. The right tube and ovary were brought up. The latter was ruptured and an active hemorrhage was taking place. The ovary was removed. The appendix was normal. Abdomen cleansed of blood and closed. Pulse at close of operation 136, but condition was otherwise good. She made an uneventful recovery. Pathologic diagnosis of ruptured follicle, no decidua or placental tissue.

The histories of these cases read very much alike. They have occurred usually (though not always) in young women, just before, during, or just after menstruation. The diagnosis has either been acute appendicitis or rup-



tured ectopic pregnancy, and the real condition has not been learned until the abdomen was opened. A ruptured Graafian follicle has been found as the only source of hemorrhage. The loss of blood has varied considerably, in a few instances it has been large enough to cause very serious symptoms. The pathologic report has shown no change in the blood vessels, or anything to distinguish the ovary or follicle from the normal. It is not difficult to conceive that if one had this possibility in mind a more or less positive diagnosis might be made before operation. Such an attack occurring about the time of a menstrual period in an unmarried woman might lead one to at least suspect that the case was one of ruptured Graafian follicle. If the symptoms were mild one might even defer operation under careful watching. However, at the present time operation would seem to be the safer plan, both because of the uncertainties of diagnosis and the possibilities of continued hemorrhage. I think these cases of acute hemorrhage from a ruptured Graafian follicle or corpus luteum should be grouped by themselves, because they are apparently not caused by any pathologic condition of the ovary or pelvic organs, and because they are emergencies which call for immediate clinical attention and usually operation.

Two variations from the usual severe Graafian follicle bleeding should be mentioned. One occurs in hemophilic subjects. An interesting case of this kind has been published by Warnshuis.<sup>49</sup>

The patient was a girl of seventeen who gave a history of having had an attack of appendicitis one year previously. At this time she had apparently been very ill. Menstruation had been regular but attended with some pain and clots. The family history was negative as regards hemophilia. On January twelfth, 1912, while attending school, she was seized with severe pain in the abdomen and some nausea, but no faintness or dizziness.

When seen later there was general abdominal tenderness, but more marked in the right lower quadrant and there was muscular rigidity. This with the history of pain and nausea made acute appendicitis a probable diagnosis, and she was accordingly operated at once. At the time of her operation her pulse was 84, temperature 99.4° F.

Upon opening the peritoneum there was a gush of fresh red blood and clots. The right tube and ovary were normal, the left ovary was ruptured and was removed. An appendix (surrounded by adhesions) which had evidently been the seat of a former appendicitis was removed. Pulse at the close of operation 140.

Pathologic report: "ovary was normal in size. There is a ruptured follicle. There were multiple hematomas but no decidua cells."

On the third day the patient had a severe nasal hemorrhage, controlled by packing the nostrils. The morning of the eighth day the nurse reported that her dressings were soaked with blood. Investigation showed that the blood had come from the lower end of the abdominal wound. The hemorrhage continued and she was taken to the operating room. The wound was reopened under local anesthesia down to the peritoneum. There was marked capillary oozing, and a small artery was bleeding in the right rectus. This was tied. Patient died that night.

Another variation worthy of note is a case of hemorrhage which occurred from a corpus luteum after operation. The case is reported by Ferguson.<sup>17</sup>

The patient was thirty-seven years of age and suffered from a fibroid. He did a supravaginal hysterectomy, the operation being a simple one. Both ovaries and tubes were left behind, as they were quite healthy. At the time of the operation a large corpus luteum was noticed on the surface of the right ovary, and attention was called to it merely as a point of interest. The operation was done in the morning at nine-thirty, the patient leaving the table in good condition. At five that afternoon the nurse noticed that the patient looked rather pale. At eight-thirty that evening the pulse had risen to 130, was very weak, and there were marked signs of hemorrhage.

The wound was re-opened under anesthesia and a large quantity of clotted and fluid blood found in the abdominal cavity. After clearing the field Dr. Ferguson made an examination of the pelvis and found that the hemorrhage had occurred from the corpus luteum seen at operation. The appendage was removed and the patient recovered. The case is of unusual interest, showing the possibilities of hemorrhage from this source after hysterectomy with retention of the ovaries, the operation as it is commonly performed today. One might hesitate in the light of his experience to leave uncared for an ovary with a large corpus luteum in it.

Excluding tubal pregnancy, there can be no question but that the ovaries more frequently give rise to intraperitoneal bleeding than any other of the pelvic organs or structures. There is apparently a good reason for this. They have little firmness, their blood supply is large, and in a constant state of morphologic and functional change from puberty to menopause. There is menstruation each month and ovulation with extrusion of the ovum. At this time the follicle fills with blood. At menstrual times the pelvic organs are congested, and to a lesser degree during coitus. Displacements of the organ or large tumors in the pelvis are apt to cause blocking of the return circulation and thus hemorrhage from the ovaries is favored.

These explanations are not altogether satisfactory when applied to individual cases. The real cause of the hemorrhage in most instances remains unexplained. We are in doubt as to the cause and we are often equally so in regard to the exact origin of many hemorrhages and the sequence of events that produce this condition. One needs only to read the pathologic reports to confirm this. There seems but little unanimity of opinion as to the starting point. Once a hematoma has formed in the ovary, the pressure causes absorption and distortion of the delicate surrounding tissues, and makes it difficult or impossible to understand the condition in detail.

Clinically we may perhaps divide the cases of ovarian hemorrhage into three groups—first, those due to rupture of the normal Graafian follicle or corpus luteum; second, those occurring from a condition known as hematoma ovarii; and third, those occurring in ovarian cysts (or solid tumors). Although perhaps each case cannot always be so definitely classified, this offers on the whole I believe a convenient clinical grouping. I have already discussed the first group. Of the second—that of hematoma ovarii, the following case is a good instance.

M. N., aged twenty-four, student. Of enteroptotic type and poorly nourished. Has a goiter with slight toxic symptoms. A question in the case as to an earlier tuberculosis of the lungs, although there are no signs apparent to ordinary examination. Has always had severe dysmenorrhea, compelling her to go to bed for a day or two. She has some bladder irritability and con-

siderable vaginal discharge at times. The uterus was retroverted and fixed, and there was a soft, fixed mass in the left culdesac. On opening the abdomen the first thing that attracted attention was a little free bloody fluid in the culdesac. The omentum had evidently absorbed some of this, for it was dark with blood. The left ovary was the size of a lemon and adherent. It was released with the uterus. Both tubes were normal, and the right ovary, although resembling somewhat in appearance the left, was normal in size and free of adhesions. On releasing the left ovary a quantity of chocolate colored fluid escaped. There were numerous small cysts (follicles) in the ovary containing dark material. The appendix was entirely normal. The ovary was removed, leaving the right one, and correcting the displacement of the uterus by an intramural shortening. The patient has been markedly relieved by the operation.

No reason can be ascribed for the condition of the ovary (the pathologist reported "hemorrhagic cyst of ovary"). There was no sign of any tubal or other infection. It is hardly conceivable that the simple displacement could have accounted for it. Here was hemorrhage not only into the ovary itself, but from it as well. The process had produced adhesions.

Wolf<sup>53</sup> has reported eight such cases of hematoma of the ovary. In four of his cases the condition was complicated with myoma of the uterus, one with tuberculous peritonitis, and in two with pelvic peritonitis.

Meriel<sup>32</sup> reports a case of dysmenorrhea in a patient fourteen years of age in whom this condition was found. No reason for the occurrence could be discovered. There are many other cases of this group reported in the literature. There is chronic retention of blood in the follicles. The disturbance is first seen in the vascular tunica interna of the distended follicles, hemorrhage into the follicle follows. The hematoma presses upon the surrounding ovarian tissue and hemorrhage takes place into the stroma. The affected organ is surrounded by adhesions.

The condition is usually associated with some other, as Wolf has stated, to which it can be secondary. We have all seen it associated with pelvic tumors. These hematomas rarely give rise to severe hemorrhage. In many of the cases no cause for the condition can be traced, as in the case of Meriel and my own.

The third group is one in which cysts of various size give rise to hemorrhage either into the tumor itself or externally into the abdominal cavity. The cause may be a torsion of the pedicle, or traumatism, or perhaps it is not discovered. When cysts of any size are fixed in the pelvis by adhesions, one very likely cause of hemorrhage has seemed to me to be trauma. Strains or falls might conceivably produce it. I personally know of one case where such a cyst was ruptured from coitus, though in this particular instance without hemorrhage. Bleeding into an ovarian cyst may give rise to symptoms simulating ectopic pregnancy—a case of my own is in point.

K. P., aged twenty-seven. No children, but was operated five years previously for right tubal pregnancy. At this operation, which was performed some time after the rupture had taken place, there were many adhesions, and in freeing the left tube for inspection the fimbriated extremity was torn away. The rest of the tube was left *in situ*, with the hope that it might allow pregnancy. The right was removed, leaving two good ovaries.



In November, 1919, she was suddenly seized with pain in the lower abdomen, resembling somewhat her former attack. Pain decreased slowly—no signs of shock. At the end of about six days an examination revealed a fixed mass in the culdesac extending to the left pelvic wall. A repetition of her former trouble was considered.

At operation the appendage was found surrounded by firm adhesions, the ovary containing a cyst somewhat larger than a tennis ball. It was filled with blood clot. The tube was closed and adherent to the surface. The appendage was removed, leaving a healthy right ovary. Recovery.

Michon<sup>33</sup> reports a case of torsion of the pedicle of a solid ovarian tumor, with hemorrhage into the abdominal cavity. (Hemorrhage into a cyst under the same conditions is not uncommon.) Le Moinet<sup>27</sup> reports a case of rupture of the pedicle of a dermoid cyst. Jayle<sup>28</sup> gives an extensive bibliography of hemorrhage from the ovary, and I would refer those interested to it. Many of the best articles appear in the bibliography appended to my paper.

Hemorrhage from a nonpregnant tube is rare. I can find no instance in the literature of the last twenty years in which a violent hemorrhage has occurred that could not be questioned. Some bleeding into the tube with clots, however, may occur, but I believe is uncommon. Bazy<sup>4</sup> goes into the pathology of three such instances, and I have in mind one instance in which I found a small amount of blood in a tube, the result of an old Neisser infection. Some bleeding into a tube the subject of torsion I have seen in a few instances.

An interesting group with hemorrhage into the abdominal cavity is formed by fibroids. This is aside from the hemorrhage from an ovary that is associated with such a tumor. Wallace<sup>54</sup> cites seventeen cases (and five doubtful ones) in which this occurred. The bleeding has often been a serious one and the mortality has been very high (25 per cent). The hemorrhage has usually come from a vein or sinus on the surface of the fibroid by the establishment of an opening in some weak spot in the vessel wall. The yielding of the weak spot has been caused by some sudden effort on exertion, or as a result of increased tension in the myoma itself, consequent to torsion of the pedicle of a pedunculated tumor. In four cases the vessels were injured as a consequence of laceration of a solid myoma or in the rupture of a cystic one; in one instance by an eroding ulceration caused by pressure of a bony projection against the tumor.

Gerstenberger<sup>20</sup> reports the case of a nurse who had been in the habit of lifting a heavy patient. She was seized with sudden faintness and at operation there was found a rent in the uterus from which severe hemorrhage had occurred. The myoma was removed and the patient recovered.

Wallace discusses the question of treatment of these cases. He suggests that in view of the very high mortality control of the hemorrhage alone should be undertaken, the removal of the tumor to be left to a more favorable time.

It is surprising that accidents of this kind are not more frequent. I have had no personal experience with them, but I very recently had reported to me by Dr. Wynand Pyle of Grand Rapids a case coming under his observation, in which this accident probably occurred. The patient was a maiden lady, over

fifty years of age. She fell accidentally on the street, was helped to her home. She became faint and short of breath. He saw her soon after and an examination revealed a hard tumor, evidently a fibroid, in the lower abdomen. She gave distinct evidence of a hemorrhage and died at the end of three hours, unoperated. No autopsy was allowed.

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METZ BUILDING.

(For discussion, see p. 302.)



## STERILITY IN THE FEMALE\*

### A REPORT OF OPERATIVE CURES

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IT IS not possible for me to present in this paper anything like a complete list of cases operated upon for sterility, neither is it my desire to enter into an extensive consideration of the possibility of relieving female sterility by surgical means. It is only by a report of cases cured at operation that I hope to combat the growing pessimism of the profession on this subject, as reflected in the recent obstetric and gynecologic literature. Though small in number, these cases have been carefully studied and followed up, and serve fairly well as illustrative examples of what it is possible to accomplish in the surgical relief of sterility.

I am well aware of the fact that many successful operations for sterility have been performed in the past, and many will, in all probability, be performed in the future. This must of necessity be so in this as in other branches of surgery, but as the subject is more carefully studied results will improve. Only too often is the fertility of the male taken for granted and, as a result, many women are operated upon unnecessarily and unjustifiably. I am glad to say, however, that I believe few gynecologists of today would think of subjecting a woman to any surgical procedure aimed at the cure of a condition for which she was not to blame, but there is still, I am sorry to say, a tendency on the part of many general practitioners to recommend a little "stretching and scraping" to every disappointed bride who consults them. Many of these take such a deep interest in the case as to actually perform the operation themselves. Much of the surgery of the past aimed at the cure of sterility, has been of this "family doctor" type and with the expenditure of very little real thought or study. The reproductive function is of paramount importance to the race and the question of sterilization is deserving of most faithful study. Every case of absolute sterility cured by operative measures, and they can be cured in no other way, is a triumph for surgery and should be duly recorded. When the end result is the birth of a living child, and the fruit of the surgeon's work carried on, perhaps, to generations yet unborn, then indeed is the victory great. Surely it would be difficult for any other department of surgery to confer a greater reward on the operator, or to show results of greater value to society.

With a constantly increasing rate of sterility among our native born, every childless marriage is deserving of most careful study. I wish that it were possible for me to place before you in this paper a complete record with end results of every case I have operated upon for sterility, or in which I have, when operating for other conditions, endeavored to relieve coexistent

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sterility. This is impossible, however, for it is only within comparatively recent times that our hospitals in New York have instituted anything like adequate follow-up systems, and many of my early ward cases have been lost sight of. With a constantly shifting population it is difficult to even keep track of private cases, and I am forced, therefore, to limit myself to a few cases of which my records are complete. I do this with a realizing sense, however, that somewhere, in some bureau of vital statistics, there are successful cases recorded that I am unable to put down here.

In order to treat intelligently any given case of sterility it is necessary to decide within as narrow limits as possible the cause, or causes of the sterility. Many times this offers such difficulty that only an approximation can be reached, and that only by a process of elimination. But the more carefully these cases are studied the less frequent becomes the necessity of depending upon a diagnosis by elimination. Possibilities yield to probabilities and as our skill in observation and deduction increases, the etiologic factor will often be found with quickness and certainty.

CASE 1.—Mrs. D. R., operated upon April 10, 1903. This patient was thirty-two years of age with a sterile married life of eight years. She acquired at the outset of her married life an attack of acute pelvic peritonitis, and suffered during several years from frequent subacute exacerbations. The examination showed a rather small uterus, anterior in position, with marked restriction in mobility. The right adnexa were enlarged and adherent, and the left enlarged, adherent, and prolapsed. Both sides were tender on examination. Ever since her first attack she had suffered from menorrhagia, dysmenorrhea, backaches, pelvic pain and increasing nervousness. At operation the pelvic condition was approached through an anterior vaginal incision, but on opening the peritoneal cavity the condition was found to be too extensive to handle by this route. The abdomen was therefore opened revealing the following conditions: Both ovaries were small and buried with the tubes in extensive velamentous adhesions to the broad ligaments, rectum, and posterior face of the uterus. These were freed and the ovaries and tubes released. The tubal ends were closed, showing a typical clubbed formation. The lumen of the left tube was so completely occluded, and the ovary so destroyed in freeing it from adhesions, that these were removed. The right tube was opened and probed, and a plastic reconstruction of the fimbriated end carried out. The subsequent convalescence was uneventful. A marked improvement in all symptoms resulted, and the menstruation became regular and painless. Eighteen months after operation she gave birth by a normal delivery at term, to an eight pound baby, and eighteen months later a daughter was born at term. Both children living.

In this case the picture presented at operation was typical of the ravages of gonorrhea when once the infection gains access to the pelvic organs. The woman was absolutely sterile. Complete embedding of the ovaries prevented the liberation of ova which, even had escape been possible, could not have been taken up by the tubes in their occluded condition. Yet observe the lightning rapidity of result when the path to the uterus had been cleared of obstruction. Eight years sterility, operation, successful delivery within eighteen months.

CASE 2.—Mrs. C. P., operated upon May 14, 1910. This patient was twenty-two years old, had been married three years, and had always suffered from

severe dysmenorrhea, backaches, and continuous pelvic pain and sterility. Examination showed a uterus of extreme ante flexion with no demonstrable involvement of the adnexa. At operation, through a transverse abdominal incision, the tubes were found to be normal but both ovaries were cystic, enlarged, and with greatly thickened cortex. A careful inspection of both ovaries failed to reveal any scars that would denote previous rupture of a Graafian follicle; it was, therefore, concluded that this was a case of sterility caused by the inability of the Graafian follicles to rupture through the thickened cortex of the ovary and discharge their ova. Both ovaries were resected, and cortical stripping done on the right one. The convalescence was uneventful, and during the following year she gave birth at term to her first child. Three years later a second child was born at term, and when last heard from on July 13, 1914, both children were living and she was pregnant for the third time.

Here, a long period of chronic oöphoritis had so thickened the ovarian cortex as to prevent the free rupture of the Graafian follicles and liberation of the ova. This was clearly indicated by the entire absence of rupture scars on the surface of either ovary.

CASE 3.—Mrs. A. C., operated upon September 17, 1910. This patient was nineteen years of age, had been married three years and a half. In 1908 she had a miscarriage at six months, followed by a prolonged convalescence with elevation of temperature and pulse. Recovering from this she was left with continuous pelvic and abdominal pain. On examination the uterus was ante flexed and showed marked restriction in mobility. No disease of the right adnexa could be demonstrated, but the left were enlarged, prolapsed, adherent and tender. At operation, through a transverse abdominal incision, the appendages of both sides were found prolapsed and adherent, the tubes being closed at their distal end by adhesions. The ovaries were likewise slightly adherent, though otherwise normal in appearance. Both tubes were opened, and the adherent ovaries freed. Convalescence was uneventful. On August 28, 1911, she was delivered at seven and one-half months of a living child.

The infection responsible for the tubal occlusion in this patient was not gonorrheal as in Case 1, the tubes themselves appearing normal with the single exception of their fimbriated ends. These were closed by adhesions to the pelvic peritoneum, to which, in all probability, they had become agglutinated during the attack of pelvic peritonitis accompanying puerperal infection. After the fimbriæ were released the tubes appeared quite normal, and resection or reconstruction was necessary.

CASE 4.—Mrs. E. T., operated upon October 15, 1910. This patient was twenty-four years of age and had been married nine years. In June, 1903, she was delivered at term of her only child. There had never been any other pregnancy. She complained of sterility, backaches, and occasional pelvic pain. The examination showed a uterus normal in size and position but restricted in mobility. The appendages of both sides were enlarged, prolapsed, adherent and tender. At operation, through a transverse abdominal incision, the adnexa of both sides were found prolapsed and adherent. The ovaries appeared normal, both tubes were closed. The occluded ends were opened and the tubes probed to the uterine cavity. The convalescence was uneventful and she was delivered at term, ten months after operation, of a living child.



The nature of the infection in this case could not be determined. She gave no history of a previous gonorrhea, and could not recall any details that would indicate an infection in her puerperium. In all probability the infection in this case was of similar character to Case 3.

CASE 5.—Mrs. L. K., operated August 10, 1916. In this case the patient was thirty-three years of age and had been married two and one-half years. She had never been pregnant but complained of continuous pain in the left lower abdominal quadrant, following a sudden attack, with nausea and vomiting one year previous. The examination showed an anteverted uterus, tender on palpation and slightly restricted in mobility. No enlargement of the adnexa could be made out, but there was marked tenderness on both sides. At operation, through an abdominal incision, it was found that both adnexa were adherent to the broad ligament and omentum. The tubes were closed, presenting a typical clubbed appearance. The left was a large hydrosalpinx, densely adherent to a cystic ovary. These adnexa were removed. The right ovary appeared normal when separated from the adhesions to the broad ligament and tube. The tube was opened and probed to the uterine cavity. Convalescence was uneventful; she became pregnant three months after operation, and was delivered at term of a living child.

Gonorrhea was undoubtedly the infective agent in this case, as indicated by the typical clubbed tubes and the large hydrosalpinx on the left side.

CASE 6.—Mrs. L. V., operated upon October 27, 1916, at City Hospital. Patient twenty-seven years of age. Married eight years, had given birth by normal labors to four children, the last in 1912. One miscarriage at five months in 1909. Chief complaints, menorrhagia, dysmenorrhea, and pelvic pain. On examination the uterus was found normal in size and position, but with marked restriction in mobility. Both adnexa were slightly enlarged and tender. At operation, through a transverse abdominal incision, the appendages of both sides were found adherent to the broad ligaments and uterus. The ovaries, when separated from adhesions, appeared normal, but both tubes were occluded at their distal ends. These were opened, and the right probed free to the uterine cavity. The left showed an obliteration of its lumen in the middle third, through which it was impossible to pass the probe. The tube was opened at this point, and the obliterated portion, about half an inch in length, removed. An anastomosis of the tube had become secure. Convalescence was uneventful. Three years later on September 23, 1919, she was delivered spontaneously of a living child.

Here we had to deal with the results of a postabortive infection, presumably lymphatic, as in Cases 3 and 4, although the obliteration of the lumen of the left tube in its middle third might indicate a previous active inflammatory process at this point. Whether conception resulted by means of this anastomosed tube could not, of course, be determined. I have never been able to trace a cure of sterility to this operation, although there have been several reported in the literature.

CASE 7.—Mrs. J. F. G., operated upon in the Polyclinic Hospital September 17, 1919. This patient was twenty-five years of age, had been married for two years and had never been pregnant. She complained of occasional pelvic pain, backaches, and periods of mental depression because of her sterility. Examination showed a small retroverted uterus with no demonstrable lesion of the appendages. At operation the anterior vaginal wall was lengthened and the abdomen opened. Both ovaries showed marked cystic enlargement with thickening of the cortex. These, on close inspection, showed no

evidence of a previously Graafian follicle rupture. The entire surface of both ovaries being smooth, glass-like in appearance, and entirely innocent of any scar that would denote follicle rupture. Both ovaries were resected with cortical stripping of the right, the uterus replaced, and the round ligaments shortened. Convalescence was uneventful. She became pregnant three months later and was delivered at term, on September 14, of a living child.

Similar to Case 2, only with retroflexion instead of antelexion.

CASE 8.—Mrs. P. R., operated upon May 31, 1918, at the Polyclinic Hospital; thirty-two years of age. This patient had been married four years without ever having been pregnant. She complained of backaches, dysmenorrhea, pelvic pain, and sterility. On examination the uterus was found enlarged, clubbed, prolapsed with the ovaries, and adherent, and contained a fibroid at the fundus two inches in diameter, with two smaller subperitoneal fibroids. The left tube was removed, the right tube opened and probed to the uterine cavity. The uterus freed from adhesions, replaced, and the round ligaments shortened. Convalescence was uneventful, and on March 18, 1920, the patient was delivered of a living child at term.

In this case the pelvic organs presented a picture typical of a previous attack of gonorrhea. As both tubes were occluded the retroflexion and fibroids could not be considered as a cause of the sterility.

CASE 9.—Mrs. C. B., operated upon November 21, 1918, at the New York Nursery and Child's Hospital. This patient was twenty-eight years of age and had been married three years. Six months after marriage she had a two months' pregnancy interrupted, and had suffered from menorrhagia, dysmenorrhea and pelvic pain since that time. Her last menstruation had occurred ten weeks before, and there had been almost daily spotting since that time. Examination showed the uterus anterior in position, slightly enlarged, tender on palpation, and with marked restriction in mobility. Both tubes were tender and the right markedly enlarged. She had been curetted on a diagnosis of incomplete abortion six weeks before. A diagnosis of unruptured right tubal pregnancy was made. At operation, through a transverse abdominal incision, a large unruptured right tubal pregnancy was removed, together with a congested, adherent appendix. Inspection of the left adnexa showed a prolapsed, adherent, closed tube. Both ovaries were normal. The tube was freed, opened, and probed to the uterine cavity. Convalescence uneventful. She subsequently became pregnant and was delivered on October 23, 1919, at term by normal labor, of a living child.

The nature of the infection in this case was uncertain. As only one tube was occluded, it is more than probable, however, that it resulted from the induced abortion shortly after marriage. Although the patient was pregnant at the time of operation I have included her in this series because, with the removal of the right tube in the presence of the occluded left, she became a case of absolute sterility, and would have so remained had the occlusion not been relieved. Here is a good illustration of the importance of always examining the opposite adnexa when operating on tubal pregnancy, not only because of the possibility of the existence of a bilateral tubal pregnancy, but because the remaining tube may be occluded and the woman left hopelessly sterile unless it is relieved.

CASE 10.—Mrs. D. M. O., operated upon in the Woman's Hospital, March 3, 1908. This patient was forty years old and had been married three years without ever having been pregnant. Her menstruation had begun at fourteen

years of age and had always been regular, lasting seven days. Ever since her marriage and for a number of years before, she had complained of constant pelvic pain, backaches, and dysmenorrhea for which she had been treated locally at different times. An examination showed a small retroverted, adherent uterus, with enlarged, prolapsed, adherent and tender appendages on the left side. At operation, through a transverse abdominal incision, both ovaries were found low down, and adherent. The uterus lay in extreme retroversion and was also adherent. The tube were short, and situated high up on the broad ligament. Both ovaries were freed from adhesions and the left, showing marked cystic enlargement, was resected. The uterus was likewise freed from adhesions and the round and the uterosacral ligaments shortened. Convalescence was uneventful. Conception promptly took place and the patient was delivered at term of a living child on May 2, 1909.

In this case there are several points of more than passing interest. The condition of adherent retroflexion is commonly associated with a low degree of fertility, and when the ovaries are covered with adhesions in addition, absolute sterility is the rule. At her advanced age of forty years there seemed very slight hope of relieving the sterility. Yet witness the brilliant result obtained less than fourteen months later; a most encouraging example of the promptness with which nature will act when given the proper assistance.

CASE 11.—Mrs. J. H. F., operated upon in the Woman's Hospital on October 26, 1914. She was thirty-six years of age, had been married one year, without ever having conceived. Menstruation began at fourteen years of age, was always regular, lasting eight days, and was very profuse. Slight dysmenorrhea had developed during the year of married life, otherwise she was free of symptoms other than the sterility. Examination showed a somewhat enlarged retroflexed uterus. The enlargement was irregular in character, indicative of the presence of small fibroids. At operation, through a transverse abdominal incision, four of these, the largest two inches in diameter, were removed from various parts of the anterior and posterior uterine walls. A larger intrauterine fibroid was removed from the uterine cavity through an incision made in the anterior uterine wall. Adhesions between the uterus adnexa and rectum were separated, the uterus replaced and the round ligaments shortened. Conception promptly occurred and she was confined at term on September 14, 1915, by a breech delivery of a living child. The labor, though her pains were strong, was a protracted one, lasting twenty-one hours. The child weighed 6 pounds, 11½ ounces. Her second confinement occurred in November, 1917. Normal eleven-hour labor, 8 pound baby. Third confinement May 15, 1919. Normal five-hour labor, living child weighing 8 pounds, 14 ounces.

Multiple fibroids of the uterus are attended with a low degree of fertility, but it is not unusual for their removal, even as late as the age of thirty-six, to result in a cure of the sterility. This patient's subsequent obstetric history is a particularly gratifying triumph for enucleation. Only too often in these cases is the woman deprived of all hope of maternity by a hysterectomy, or radium or x-ray treatment. Had this patient been so treated the world would have been a very dark place indeed for her, and three healthy children would never have seen the light of day. Her first confinement, a protracted breech delivery, with strong labor pains for twenty-one hours within less than one year after operation, shows how firmly the incision in the uterine wall, through



which the fibroid in the uterine cavity was removed, had healed. The maintenance of the normal position of the uterus after three puerperiums is a particularly gratifying tribute to the operation of ligament shortening by which the retrodisplacement was corrected.

#### SUMMARY

In this series of cases the average period of sterility was three and one-half years. One case of seven years' duration was cured in ten months. The average time from operation to the birth of the first child was 15.3 months, while seven patients gave birth within one year after operation.

Seven of these patients were unconditionally sterile due to tubal occlusion, and these subsequently bore eight children—quite a respectable sized family—that owe their appearance in the world absolutely to conservative surgery. These eleven women operated upon have, to date, borne 16 living children, and eight are still in the childbearing period.

Such results as have been obtained in these cases should go far towards creating in the surgeon added respect for the art he practices and a firmer belief in the value of conservative gynecology.

163 EAST SEVENTY-FIRST STREET.

(*For discussion, see p. 306.*)

## ARTIFICIAL IMPREGNATION: ESSAYS IN TUBAL INSEMINATION\*

BY ROBERT L. DICKINSON, M.D., NEW YORK, N. Y.

THE only unimpeachable evidence of efficacious instrumental insemination comes from our successful and scientific brother the veterinarian, because he can exercise complete supervision over his patient. Human tests are blocked by aversions, vitiated by reticences, and happy results are not susceptible of rigid proof, because intercourse may have followed treatment. The plausibility of any claim must rest on the publication of histories and methods in some detail. All attempts should be listed, inasmuch as this is one of the clinical series in which no one observer is able to present any large group of cases. The records will follow in a later article. In this paper the technic is reported on, with a summary of results.

As marriage is an experiment in procreation without preliminary tests for fitness or instruction in method, it should be considered satisfactory that there occur something like 90 per cent of successes—although some cities and countries average 20 per cent of childless marriages. Inability to conceive at all accounts for about half the “sterile” marriages (Schaeffer). The husband’s defective semen, judged mostly from a single examination of a condom specimen, is generally said to be responsible for one in five of these disabilities, but Huhner doubles this particular figure, and I also would place it higher. We have then to consider those couples where the semen is vigorous and there is no obstruction in the lower genital passages, and no infection. Even where an anteflexion or retroversion is present, before operation is considered the woman is entitled to any measure that holds out a reasonable promise. Suppose this method of artificial insemination does hold out a reasonable promise. Then the program will be as follows. Man and wife are each brought up to good physical condition and their sex-life is studied and regulated. These measures failing, trial will be made of a course of instrumental impregnation. The presence of marked flexion or mobile retroversion need not preclude this, since safe passage through the dangers of the miscarriage period can usually be accomplished with a sufficient degree of care. The instrumental instillation failing, operation may be done for well marked anteflexion or retroversion-flexion, particularly in the presence of real pain or disability. Laparotomy on the single indication of sealed tubes to be opened or deployed is generally frowned upon because of a common agreement in the reports of scant success. Laparotomy to study and incise the ovaries, where it is supposed ova need freeing, has an advocate in Reynolds. Laparotomy after six months of marriage just to find out what can be the matter with a woman who appears to be sound has been urged only by Solomons of Dublin. Whatever the program that appeals to any student of the question, there will hardly be denial that better knowledge is needed concerning what constitutes normal sex life, concerning the male secretion, genital incompatibilities, and physiologic deficiencies.

\*Read at the Forty-fifth Annual Meeting of the American Gynecological Society, Chicago, May 26, 1920.

Nor can some or all of the following considerations be passed by in any particular problem under review.

#### PRELIMINARIES

Verification of the male secretion will one day be the routine first step. Two or three microscopic examinations are needed. Semen does not run true to form. It is a gauge very sensitive to changes in general physical condition and may present quick and sweeping alterations without apparent adequate reason. Activity of spermatozoa is of major importance, but survival-hours are all-important too. Stated in the baldest terms, the two requisites are that in the fresh warm specimen seen in the deep covered slide speedy transits across several fields should be under way, and, furthermore, at room temperature, activity should persist for hours. One may see the trapped tail, the feeble stroke, short lived action, or even azoospermia yield to a vacation or reduction of obesity, and such betterment, combined with cure of the commonest sterility lesion in women, endotrachelitis, sufficient to start a family. Coitus is to be regulated. Prolonged intervals may produce as poor specimens as undue frequency. An individual has a normal cycle which will deliver the best result, and this might be worked out, but 7 to 10 days is a fair average for the liveliest persistence in my few studies of multiple specimens.

On the part of the woman, correction of flabby or rapid obesity counts, as does general condition, good periods, and sex responsiveness.

Leucorrhea of an acid or purulent character is to be arrested, and this goes hand in hand with its main cause, unhealthy condition of the lining of the cervix. The spectacular cures are those in which healing of the raw surface or drainage of the clogged canal is instantly followed by conception.

The mild alkaline douche an hour or so before coitus is in use for strongly acid vaginal secretions and will be used even where litmus does not make any such accusation. I cannot get a chemist to devise any simple quantitative test of vaginal acidity.

Study of the reaction of a vaginal secretion on a particular semen is of limited application for most doctors in office work, and tests carried up into the cavity of the uterus are subject to too many errors to belong to any but a few experimenters. Some of these moot points are touched on in the second portion of this paper.

Retention of semen by a condom-covered tampon, inserted at once after emission, may be tried where the vulva gapes, but my various experimental modifications of pessaries to develop a semen trap have not been effective.

Tests of the patency of the tubes will be routine when the procedure is standardized. I tried Cary's injection of silver salts, with vague x-ray shadows. Cary's simple instillation of sterile fluid in the genupectoral posture is promising. If it disappears in quantities over 10 minims the way should be clear. My trials that show free passage of semen have demonstrated patency in the same way. These procedures are infinitely easier though less certain than the injection of oxygen and its appearance under the diaphragm—calling as oxygen does for apparatus and special skill and with sequelæ sometimes distressing.



Lastly we rule out of consideration patients with gonorrhea or suspicion thereof, tubal distention or tenderness and inflammatory processes of any degree in the pelvis.

#### TECHNIC

During the office examination one selects the shortest or smallest bivalve speculum that will make a good exhibit of this particular cervix in the knee-chest position, and also tests a snug fitting curved pipette in the internal os. A note or mark is made on the pipette to show how far up 10 minims will fill its caliber. After a date is made—to follow a week of continence—the husband is given a sterile test tube, dry and corked. He is directed to wash carefully and secure a friction specimen about an hour before the appointed time, taking care that the inside of the cork makes no contacts, and to keep the tube warm but not hot, under a warm water bag or in a Thermos bottle. He is to verify by telephone a successful production.

The following are sterilized: bivalve speculum, single tenaculum, two or three pipettes in test tubes, applicators, cotton-tipped, and towel and tray on which to lay out the above. (Forceps and scissors in case condom specimen is to be used). All pipettes to be dried.

At the home some third person is to be near at hand, though not necessarily in sight. Good illumination is needed—droplight and head mirror or headlight preferred. Bladder and bowel are previously emptied. All the materials are spread conveniently at hand. The patient takes a real knee-chest posture at the edge of and across the bed. The bivalve gives a clear view of the ballooned vagina, and also a free play to the uterus such as cannot obtain with this instrument in the dorsal posture. This free play is important in gaining ready access to the cavity of the uterus. The tenaculum steadies the cervix and serves to draw open the canal, which should rarely need to be wiped and on which no antiseptic should be used. The pipette is now very gently filled above a point known to be 10 minims. (The uterus holds 8 to 10 minims.) The tip touches first the interior of the cervical canal as high as may be and is passed to near the fundus. The fit to the internal os prevents regurgitation, or if it does not, one makes a change. Gentle, steady pressure is made on the bulb until “unwell feelings” are produced and continued till there is consciousness of slight distress in the sides of the abdomen low down, at which time the Fallopian tubes are presumed to have fluid in them.

Then pipette, tenaculum and speculum are withdrawn, the patient slides onto her side with the hips a little elevated, to remain thus at least an hour.

The Skene uterine pipette is a bit thicker than a uterine sound and curved like the sound. Its opening must not be minute, as Huhner's curled up forms of defunct spermatozoa are produced by quick suction through narrow orifices. The advantage over any syringe is that the contents are all in sight, the interior is easily cleaned and various sizes are at hand. The sharply recurved single hook of Emmet does not give the discomfort of the heavy double forms.

The following are variants in the above methods. As a substitute for ejaculation into the test tube one is reluctant to concede the use of the condom, as it presents many more possibilities of contamination. The vulva and the

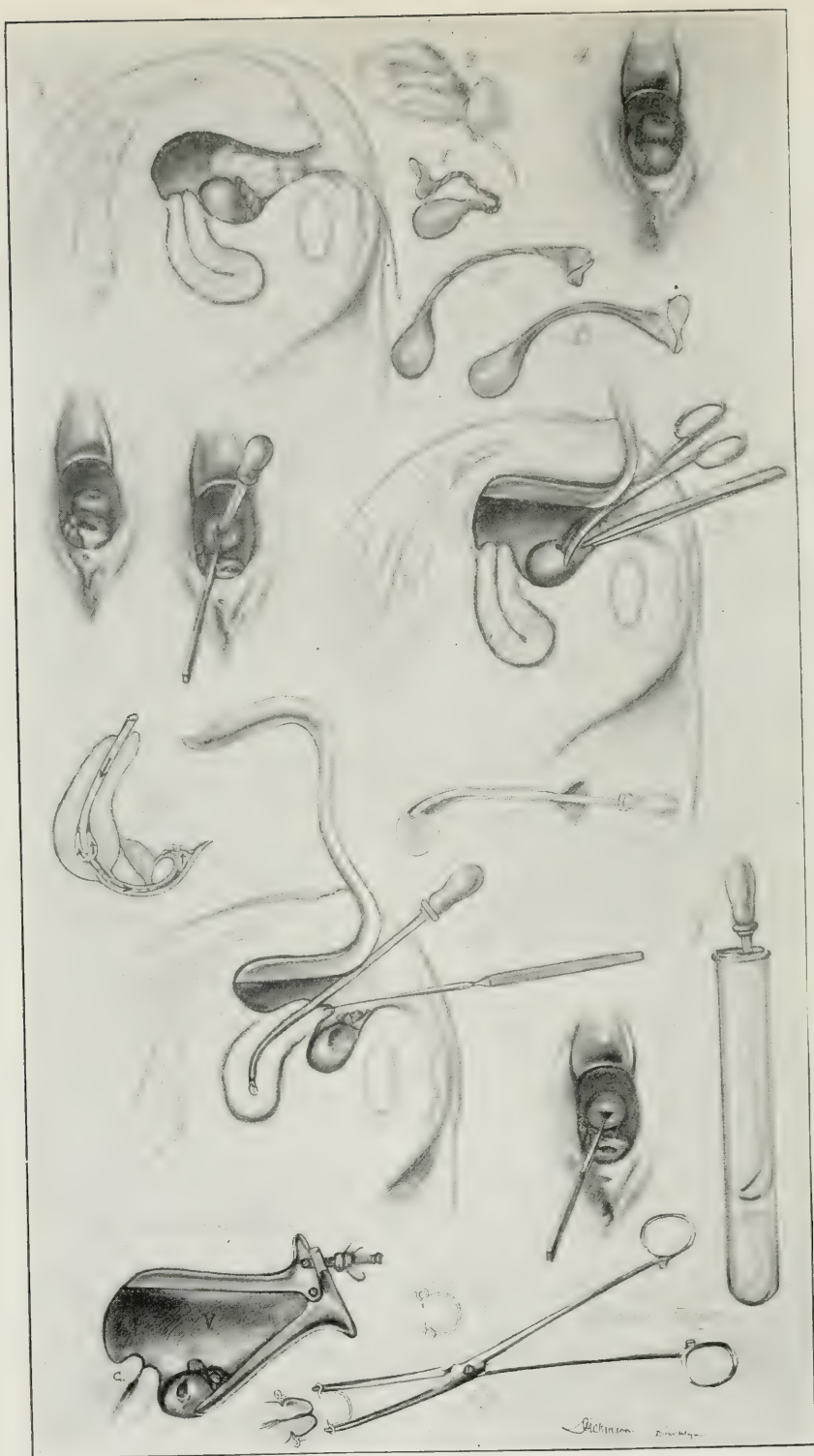


Fig. 1.—Methods on trial in past years. Part of author's exhibit at the International Congress in London in 1913. The condom as the reservoir, pipette instillation, clip closure of cervix. 1. The neck of the condom twisted, after ejaculation, without removal from the vagina. 2. The tampon that is introduced before rising to hold the condom in place in order that the patient may come to the office. 3. The patient in the knee-chest posture. 4. The speculum in place. 5. The cover steadied with a forceps and slit, as seen in 6, 7 and 8. The Skene pipette, sterile dry and warm, sucks from the slit and injects as shown in 9, into or through the tube, as 10 gives it diagrammatically; 11 is ready for the clip. 12, placed by a Pozeman forceps as seen in 13, before and after placing. Alternate plans are given in A, and B the condom uncoiled with its head still in the vagina, C, the pipette passed into it; finally D, employing a bivalve in lieu of a Sims speculum when one dispenses with a nurse.

penis are washed, and coitus occurs with the condom. The contents may be kept warm in two ways. One way is to tie the mouth and drop the condom into a test tube which is laid under a warm water bag. The other takes care to leave the cover and its contents within the vagina, twisting the part hanging out and returning this part inside the passage. Under these circumstances there can be no danger of chilling or overheating and thus damaging the specimen. When ready to inject, the patient having taken the knee-chest posture and the speculum being in place, the condom is steadied with forceps and slit with scissors to let the pipette suck out the amount needed. When insemination is done at the office this has been the usual method, the condom having been retained by a tampon furnished to and placed by the patient. Finally it may be noted that one genitourinary specialist obtains a fresh specimen for injection by providing facilities for coitus at the office.

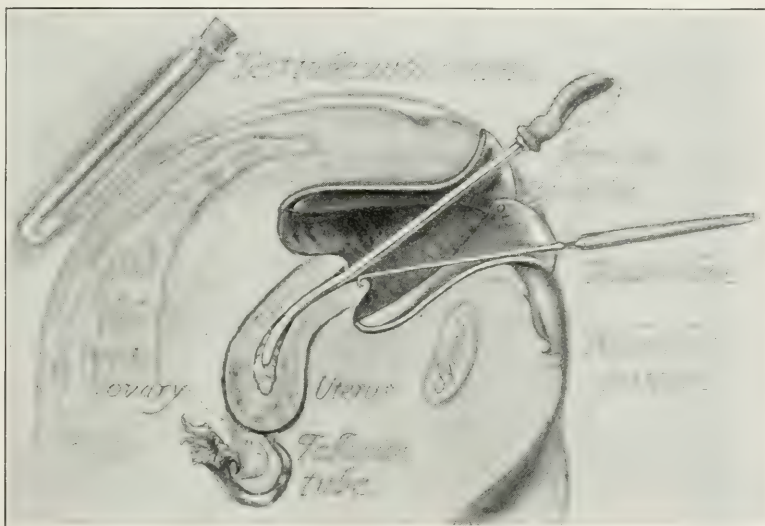


Fig. 2.—Insemination, using a short bivalve speculum, a single, well-angled tenaculum; a pipette with the curve of a uterine sound and of a size to fit the internal os, and a large rubber bulb. The body of the uterus is shown distended with semen.

Where autoerotic or cover processes completely inhibit, a specimen may be obtained by slipping the mouth of a sterile test tube within the opened labia immediately upon withdrawal. Washing of the genitals of both should have preceded this also. In place of the test tube one of the little spherical soft rubber bulbs with the soft tip has been used. These devices are worth remembering for another purpose, moreover. By such methods of collection semen can be secured in quantity in those instances where a man avers that he is desirous of having children but refuses to take the steps necessary to prove that the default is not his. Some such plan is necessary when he asks for or consents to operation on his wife but declines an essential preliminary, since no surgeon nowadays is excusable for any operative measure or any gynecologist for a course of treatment on a woman for sterility until a good quality of male product can be certified. Finally, this product must be shown



to be of good quality at the time and not merely to have been right in some past period.

#### OBJECTIONS

1. The possibility of infection of tube and peritoneum cannot be excluded. But normal insemination involves something traveling an inch an hour from the vagina—after labial and subpreputial “smears”—up into the uterus or tube or peritoneum, and all canals exhibit some reverse currents. If we use semen that has spurted clean into a sterile test tube and the cork is safeguarded, a specimen above reproach seems to be furnished. To be sure material from the canal of the cervix may be carried on the tip of the pipette and thrown into the tube and reach the peritoneum. (Curtis has demonstrated bacterial travels.) But in the absence of gonorrhea, of mucopurulent leucorrhea or cervical catarrh, production of salpingitis or peritonitis seems to the writer unlikely with a good technic. So far as symptoms go I am able to report that among 31 women none developed uterine colic, one with a half-hour tubal colic, and one in bed several days with discomfort, but without exudate or tender tube.

2. Old tubal disease may be lighted up anew. It may, for a tubo-uterine orifice never closes. For the present at least such cases should be avoided.

3. It is possible that all that injection of semen accomplishes is to open the tube, in which case other fluids would do as well, and antiseptics be safer as used by Stone and Boveé. Only tests can tell.

4. One can have no assurance that coitus subsequent to the treatment was not the real agent in procuring conception. This may be true and this is the reason that the veterinary surgeon can offer proofs which we cannot.

5. It fails with semen which is not vigorous. It was devised for just such cases and it has not helped so far.

6. The field is very limited because patients revolt at the idea, or give it one trial instead of half a dozen. They prefer laparotomy. All this is exact, but it does not relieve us of the responsibility of preventing the patient taking the greater risk should there be a simpler way, did we but have the will to face the distastefulness of working it out.

#### UTERINE INSTILLATION

Uterine instillation is insufficient. The material injected into the cavity of the body of the uterus seemed to drain out promptly. This is probably because of the intermittent contractions normal and constant in nonpregnant uteri, and because a degree of opening up of the internal os has occurred in making the deposit. To overcome this, vaginal tampons were tried and abandoned. A clip was built to snap on the cervix and prevent exit of the semen, but it was not effective. Therefore the deeper placing of the seed was undertaken. All the good results have been obtained since this time.

In so far as repetition of the procedure is concerned, three attempts at monthly intervals should be the minimum and six should be asked, explaining that six months is not an unusual time for normal means in normal people. As to the time of the month, three of our conceptions followed injection within a week of the expected period, the period coming on incompletely.

## SUMMARY

In women presenting histories or pelvic findings pointing to the sealed tube following milder types of salpingitis, entirely quiescent, injection into the uterine cavity of active semen produced no results in twelve instances. Strong pressure was not deemed warranted.

In women with no gonorrheal histories or findings, free from cervical inflammations and evident uterine, tubal or ovarian lesions or abnormalities, living semen of the poorer grades produced no results, in nineteen patients. No infection followed except in one possible instance and that of mild type. Several of these received three trials.

With fairly normal pelvic organs and semen of good quality, five pregnancies followed and are believed to have been due to tubal insemination. The knee-chest posture, the curved pipette fitting the internal os and carried nearly to the fundus, injection into the tubes, horizontal rest, and repetition three to six times—these are considered important. Trial of this method may well precede resort to operation—save those done for external obstructions.

438 WEST ONE HUNDRED SIXTEENTH STREET.

*(For discussion, see p. 306.)*

## A METHOD OF COVERING RAW SURFACES UPON THE UTERUS\*

BY GEORGE GELLHORN, M.D., F.A.C.S., ST. LOUIS, MO.

IT IS a surgical axiom that raw surfaces within the abdominal cavity should be covered with intact peritoneum. This, in many instances, is a comparatively easy procedure where only small parts of the intestine have become denuded. When more extensive portions of the intestinal tract are involved as in the removal of large and widely adherent ovarian tumors or fibroids, the prevailing custom is to leave these areas of denudation to themselves. It is not only impractical to stitch over the affected field in its entirety, but actual observation has proved abundantly that adhesions between intestinal loops do not often affect the well being of the patients. As soon, however, as intestines or omentum become adherent to the uterus a train of unpleasant symptoms inevitably ensues. A pulling sensation in the upper part of the abdomen, gastrointestinal disturbances of various degrees, and more or less ill-defined pains occur, and even transitory ileus-like phenomena are not uncommon. On the part of the uterus, the abnormal attachment of loops of intestine with a varying amount of distention leads to decreased mobility of this organ and, in its further development, to menstrual disturbances. The continuous pull exerted by the structures above and behind may eventually force the uterus backward and may, in some cases, even undo the result of a previous antefixation operation.

Here, then, is the problem that confronts us. We have, for example, decided on a Gilliam operation or one of its numerous modifications or substitutes in a case of fixed retroflexion. We have broken the adhesions that held the uterus to the depth of the culdesac or the rectum. We have shortened the round ligaments and now behold the uterus lying in normal position but with a more or less extensive area of denudation upon its fundus which invites the speedy formation of new adhesions.

Or take, as a second possibility, the case of an inflammatory process in one of the tubes, which is rarely confined to the affected side but implicates the uterus as well. Shall we remove the diseased tube and ovary and close the abdomen without an attempt to peritonealize the raw fundus? Where a bilateral pyosalpinx of gonorrheal origin demands the extirpation of both tubes, my personal choice is a panhysterectomy, after which the covering of the entire field of operation with intact peritoneum is an easy matter. I am aware, however, that such radicalism, despite its well-established advantages, has not yet become a general practice and the question is still before us, how to protect the uterus from further harm, useless though it is as an organ after a double salpingectomy.

It is evident that these two categories of fixed retroflexion and of adnexal disease constitute a not inconsiderable percentage of our gynecologic

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operations so that a method of covering the denuded uterus with intact peritoneum may lay claim to practical importance. The very sporadic efforts that have been made in the past have been rather discouraging. The Cargile membrane of R. T. Morris has never become popular, and the grafting of pieces of omentum first introduced into surgery by Senn, has been largely disappointing.

Yet, the difficulty is easily solved by a procedure, the various steps of which are as follows:

The fundus is grasped by a volsellum and pulled backward and upward in the direction of the promontory. The reflection of the bladder peritoneum upon the cervix, which now becomes plainly visible, is incised transversely as in a hysterectomy and pushed off from the uterus (Fig. 1). If this blunt dissection with the finger is gentle enough and does not extend into the

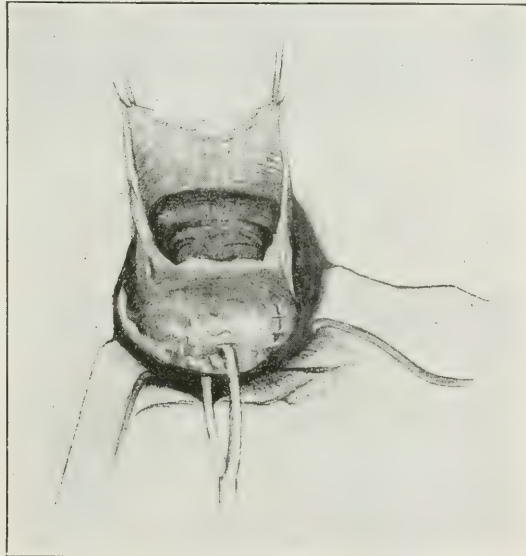


Fig. 1.—The bladder peritoneum has been pushed off the cervix and is held ready to be reflected across the fundus. Note the bladder in the depth of the wound.

broad ligaments, the bleeding is usually insignificant and is quickly checked by the pressure of a sponge. The uterus is then tilted forward, the bladder peritoneum is pulled over the uterus and stitched to the posterior aspect of the fundus where an intact peritoneal surface presents itself (Fig. 2). In small uteri, the bladder peritoneum may be fastened as far back as the insertion of the sacrouterine ligaments, if necessary. After the first few turns of this continuous catgut stitch, the volsellum is removed and the stitching is continued until the entire fundus with its denuded area has disappeared beneath its new peritoneal covering. By using an inverting stitch, even the catgut knots become invisible. The newly formed covering consists *only* of the bladder peritoneum which in many cases, is so thin and transparent that the raw uterine surface and even the volsellum holes may be distinguished.

The method just outlined not only supplies the raw fundus with a new serous coat, but it also safeguards a normal position and mobility of the uterus, and the late results have remained most satisfactory. It is, however, not to be relied upon in a case of fixed retroflexion. In such a case the order of the operative steps is this, viz., first, loosening of the bladder peri-

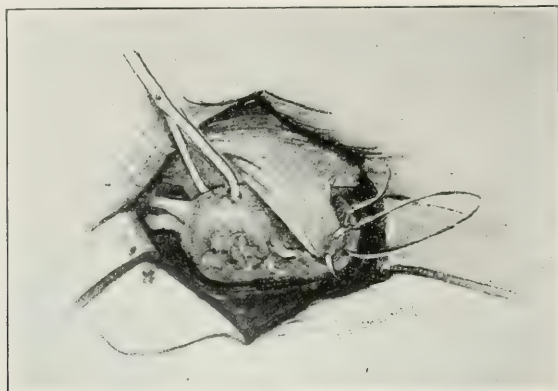


Fig. 2.—The apron of bladder peritoneum is being stitched to the posterior aspect of the fundus.

toneum as described above; second, shortening of the round ligaments; third, fastening of the bladder peritoneum to the back of the uterus beyond the area of denudation.

I anticipate two pertinent questions: "Is the function of the bladder disturbed after this procedure?" and, "What happens to the bladder in a subsequent pregnancy?" In the six or seven years that I have employed

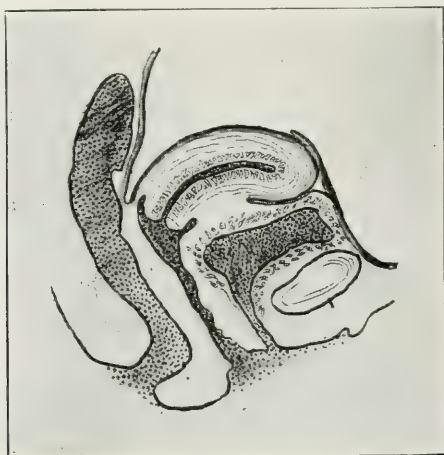


Fig. 3.—A diagrammatic view of the postoperative conditions shows the relation of bladder and uterus unchanged. Hence no probability of vesical disturbances.

the method, I have *never* observed instances of vesical disturbance other than those that may follow any laparotomy. A moment's visualization of the condition created will supply the theoretical explanation of the absence of postoperative complications. The relations of the bladder and uterus are

not essentially altered. The uterus still lies on top of the bladder. Only the peritoneum which at this point is loosely connected with the bladder, is stretched and pulled across the fundus (Fig. 3). The bladder, at the border of posterior and upper walls, may adhere to the uterus a little higher than normally, but still on its anterior aspect. Hence, the filling of the bladder with urine will cause neither subjective nor objective disturbances.

The same freedom of the bladder obtains in pregnancy when the gravid uterus may rise into the abdominal cavity without dislocating the bladder much more than is the case normally. I have seen one case that terminated in a miscarriage after four months. This patient at no time complained of vesical symptoms.<sup>1</sup> None of my other private patients has conceived thus far. I have no knowledge whether any of my hospital patients had become pregnant because our follow-up system is as yet undeveloped. Theoretically, the probability of pregnancy in the class of cases concerned is not very promising. Pathologic changes within the uterus that may have become permanent, alterations in the functions or structure of tubes or ovaries, azoospermia in the husband—all these factors may militate against conception.

The plan of preventing uterine adhesions is so simple and so self-evident that I doubt not but that others may have invented the method for themselves. In any event, I submit it to your consideration in the conviction that it will still further increase the efficacy of our gynecologic operations.

METROPOLITAN BUILDING.

(*For discussion, see p. 310.*)

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<sup>1</sup>NOTE. Since writing the foregoing, a second patient on whom this procedure was done after the enucleation of several fibroids, has conceived. She is now (November, 1920) about four months' pregnant and has had no bladder symptoms of any kind.



## LUTEIN CYSTS ACCOMPANYING HYDATIFORM MOLE\*

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### INTRODUCTION

THE opportunity to have observed two cases of large bilateral multilocular lutein cysts accompanying hydatiform mole prompted a review of the textbooks and other literature at my command. The fact was thus brought to my attention that these cases are comparatively rare, and therefore are of sufficient importance to warrant this report. The bulk of the literature relating to conditions of this kind is given to a discussion as to the cause and relationship of mole and chorion epithelioma and very little to large bilateral multilocular cysts, which in a very small proportion of cases seems to accompany only mole or its related disease, chorion epithelioma. Previous to 1905, the literature, although containing reports of similar cases, does not go into detail or attempt any explanation as to the possible cause or formation of these cysts, whether of the large, fast growing type or of the ordinary corpus luteum cysts.

In 1905 Patellani reported 68 cases of chorioma in which bilateral cystic changes in the ovaries occurred in 62 cases, or 91 per cent. However, his record does not attempt to show, so far as I am able to ascertain, whether these cystic changes in the ovary were of the large multilocular type similar to those found by myself.

Findley reports only 58 cases out of the 500 cases of chorioma and mole that he was able to review. What percentage of them were of the pathologic type of cyst I am not able to ascertain.

Paul Bar reports one case of large bilateral corpus luteum cyst accompanying chorioma and believes that when this combination occurs one should do a hysterectomy. He also thinks that these ovarian cysts continue to develop after removal of the mole.

Schwarz reports a case accompanying chorion epithelioma and his description of these tumors corresponds very much in detail to those seen by myself.

Wallert, in 1908, collected several cases of pregnancy in which he found cysts almost as large as in a certain case of chorioma, but he neglected to state how large these cysts were, and therefore his observation, so far as the report is concerned, is not of much value.

### ETIOLOGY

Stoeckel, in 1901, showed that many of these cysts are developed from the corpus luteum and are accompanied by a more or less diffuse infiltration of the ovary with lutein cells, from which multiple cysts probably arise. However, he was not able to definitely prove his case.

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Seitz, in 1906, gave us our best interpretation as to the cause of these cysts, when he said that the origin of the cyst could be attributed to the atresic follicles of the ovary and attempted to prove that the hyperplasia of these follicles is quite different from those of a true corpus luteum. He thus drew a distinction between cysts of the true corpus luteum and the polycystic conditions found in mole and chorioma. He also attributed the great size of these cysts to some mechanical factor, as a venous congestion from adhesions, chronic nephritis, etc.

Ewing, commenting on Seitz's observation says: "The chief origin of the multiple cysts may be from the atresic follicles. Seitz's argument that the condition in the ovaries in chorioma or mole has no other significance than that of a slightly exaggerated normal process, is plainly defective. The astonishing grade of cystic degeneration common with mole is not duplicated in any other condition and mechanical factors cannot be held responsible for this change." He also adds "In view of all facts and the occurrence of peculiar bilateral cysts of the ovaries in at least 91 per cent of cases of chorioma, it is difficult to escape the conclusion that there is some essential relationship between chorioma, mole and these polycystic conditions of the ovaries."

#### HISTOLOGY

These cysts undoubtedly come under Class IV of Ewing's classification, in which he says they are cysts lined by lutein cells, covered by cylindrical, cuboidal or flat epithelial cells. The walls of these cysts are very thin (almost translucent) and may contain a clear, limpid fluid, sometimes bloody and sometimes containing gelatinous clots.

Somewhere I have read that these cysts were probably retention cysts with fluid coming from the secreting lutein cells, or possibly an exudate of serum from adjoining vessels.

Schwarz feels inclined to derive the lutein cells in his case from theca cells and found in many places numerous islands of these cells scattered in the stroma, showing no signs of degeneration. On the other hand, the cells lining the cyst cavities are undergoing retrogressive metamorphosis.

Schaller, Pfoerrinder, and some others, express the view that the lutein cystomas might be a carcinomatous degeneration of lutein cells. However, the rapid growth of these tumors is no sign of malignancy in the cells themselves. So far, nobody has been able to find any evidence of malignancy in these tumors. Some one has suggested that the smaller cysts in the ovaries were probably preceded by hemorrhage into the follicles, which in some way leads to an excessive production of lutein tissue and subsequently these cysts become distended by a secretion from the cells themselves.

Eden and Lockyear in their textbook, are inclined to believe that these tumors come entirely from the theca cells of the ovaries.

#### CLINICAL HISTORIES

CASE I.—Mrs. J. A. P. Aged twenty-two. Para, II. Presented herself Oct. 3, 1916, with a history of having had a forceps delivery two years previously, which evidently had been a very hard one as at that time the vulva had been torn loose from the pubes, the cervix and perineum badly lacerated. The last

menstruation was June 12, 1916, about four months before she came under observation.

Examination at that time showed an extremely anemic woman with a rather marked dilatation of the heart as a result. Vaginal examination showed her uterus enlarged to about a four months' pregnancy, freely movable, and not much, if any pain, on motion. Abdominal examination, however, showed the presence of free fluid and on both sides of the uterus could be felt large masses, which seemed to be cystic in nature. Examination of the chest was negative for tuberculosis.

The patient gave a history of bleeding for the last three months, and during the past week had had several uterine hemorrhages, but has not passed any material from the uterus.

I made a diagnosis of tuberculous peritonitis complicating pregnancy.

Our decision was to operate for the peritonitis and allow the patient to abort spontaneously. A median incision made above the umbilicus immediately disclosed a large amount of fluid, containing gelatinous clots. Further exploration revealed a very large multilocular cyst of each ovary with very distinct pedicles; no adhesions. The tumors were removed and the wound closed in the usual manner.

Postoperative examination of the tumors showed them to be made up of multiple cysts, each tumor being about the size of the adult head. The cysts were translucent and so exceedingly thin walled that when lying upon the tray the serum seemed to ooze through the walls. On section, they contained a straw colored material, which was slightly blood tinged, and some gelatinous clots. Nowhere could any evidence be found of tubercles.

The diagnosis was made of bilateral multilocular lutein cysts of the ovary.

The following day the patient aborted a portion of a hydatiform mole of the characteristic consistency, shape and appearance. Patient was again anesthetized, the mole removed with forceps, and the uterus packed with gauze, no curette being used.

Patient made an uneventful recovery and is alive at this date with no evidence of chorion epithelioma.

CASE II.—Differs somewhat from Case I in several clinical features. This patient came under observation three months later, in December, 1916. Thirty-one years of age. Para VII. The last menstruation had been two months' previous to coming under my observation. The youngest child was ten months of age and she had nursed it for eight months.

She had flowing for two weeks. No particular pain but no brisk hemorrhage. Vomiting had persisted since the last menstruation.

The urine gave a marked reaction for diacetic acid.

Her condition was treated as one of pregnancy with accidental hemorrhage, and two weeks later the patient was again examined. This time the uterus had enlarged from the size of a two months' pregnancy to that of practically one of five months.

A diagnosis of mole was made and the mole was removed under anesthesia with placental forceps, but no curetting. Having in mind the previous case, a painstaking search was made for possible cysts of the ovary, but none could be found.

One month after the removal of the mole, the patient in the meantime having gone to another city on a visit, she presented herself for examination, which revealed the uterus to be rather enlarged and retroverted, but now, in the abdomen could be felt two large tumors, each about the size of one's fist. They were fairly hard and did not feel cystic. However, in view of the previous case, a diagnosis was made of bilateral cysts of the ovaries, with a possible chorion epithelioma developing. Operation was advised and accepted, and I found both



ovaries slightly larger than my fists, containing multiple thin-walled cysts. No free fluid in the abdomen. The uterus was large and flabby, about the size of a two months' pregnancy. There were no apparent signs of chorion epithelioma, but having this in mind, a hysterectomy was done, with the removal of both ovarian tumors. The wound closed in the usual manner, and the patient made an uneventful recovery, and to this date is strong and well, with no evidence of any recurrence.

Microscopic examination of the uterus, after very diligent search, showed no evidence of chorion epithelioma. Examination of the cysts showed the same character of cysts as found in the previous case, though they were not so large. The fluid contained was straw-colored and slightly bloody in appearance.

Postoperative Diagnosis: double multilocular lutein cysts of the ovaries; subinvolution of the uterus.

#### COMMENT

These two cases present several very interesting features:

1. The appearance of the ovarian tumors, in one case appearing with the mole (in fact, clouding somewhat the history of mole), and in the other case seeming to arise and starting to grow rapidly after the mole had been removed.
2. The gross and microscopic appearances of these cysts are in marked contrast to those of the ordinary type of ovarian cyst.
3. These multiple lutein cysts are beyond a doubt different from those normally appearing during pregnancy.
4. These lutein cysts undoubtedly accompany only the formation of chorion epithelioma and mole and are probably not to be found in any associated condition.

There are many references in the literature as to the occurrence of cysts of the ovaries accompanying pregnancy, mole or chorioma, but I am sure that many of these references are only to small cysts, which disappear spontaneously after expulsion of the mole or the fetus, as the case may be. From the appearance of such large cysts as here described, and described elsewhere in the literature, I believe this to be an uncommon condition.

#### DIAGNOSIS

Here, as in the first case, one must differentiate between the presence of tuberculous peritonitis. The presence of ovarian tumors with mole, or history of mole having been expelled, should lead one to suspect the formation of these tumors.

#### PROGNOSIS AND TREATMENT

Eden and Lockyear assert that some of these cysts recede after the expulsion of the mole, and such cases have been recorded by Russell, Andrews and Albert, but this literature is not available. Findley comments that occasionally cystic ovaries become greatly reduced in size following delivery of the mole and reports in the 58 cases collected by him that in only four was there any retrogressive change following the expulsion. Still, he does not specifically state that these were large lutein cysts such as described in this condition.

In view of the fact that the literature in the large majority of cases connects this condition with the presence of chorion epithelioma, and also in view of the fact that the condition is undoubtedly a retrograde metamorphosis from the normal cystic conditions found in the ovary, I believe that we are perfectly justified in not waiting for the recession of these tumors, but that we should operate and remove them when found. The small cystic tumors of the ovaries, accompanying mole, I would be inclined to keep under observation. Whether we should do a hysterectomy at the same time as the removal of the tumors, remains an open question.

## LARGE OVARIAN CYST WITH TWISTED PEDICLE COMPLICATING PREGNANCY

BY CARTER S. FLEMING, M.D., FAIRMONT, W. VA.

**T**HIS patient was referred to the writer at Cook Hospital, August 1, 1920, by F. W. Hill of Montana, W. Va., with a diagnosis of acute intestinal obstruction complicating pregnancy.

Mrs. B., Polish. Married seven months. Age twenty-eight. Housewife. Chief complaints, abdominal pain, weakness, shortness of breath and headache. Family history uneventful.

Patient has had no operations and no serious adult illnesses. States that, with the exception of dyspnea, she felt well two days ago until she ran down a rather steep hill to catch a train. While running she felt something "slip" in her abdomen and experienced an acute pain in the left lower portion of the abdomen. She visited in Fairmont for several hours, during which time she had no pain, and returned home in the evening. During the night the pain recurred with increased severity, being cramp-like in character. She took a large dose of castor oil. The following morning, August 1, the pain was still worse, no bowel movement had occurred, and Dr. Hill was called to see her. Dr. Hill states that her abdomen was markedly distended, her respirations rapid and difficult, temperature 101° F. and pulse 110. A soap suds and turpentine enema was given with no results. A vaginal examination revealed the uterus forced down into the pelvis by pressure from above. The woman was advised to enter the hospital at once, but she preferred to wait for several hours. Several more enemas were given with no results. During the afternoon the pain was increased, no bowel movement had occurred, and she agreed to enter the hospital.

Menstruation began at thirteen; regular, 28-day type, lasting five days. Her last period began on February 25, 1920.

Patient states that she is five months' pregnant, which pregnancy is her first. Bowels have always been regular and moved last on July 30. Micturition has been normal. No vaginal discharge.

Examination upon admission to Cook Hospital, August 1, 1920, at 6:00 P.M., revealed the following: Well nourished young woman complaining severely of abdominal pain and difficulty in breathing. Very pale. Tongue

dry and coated. Heart and lungs negative. Mammary glands show usual changes of pregnancy. Abdomen longitudinally ovoid and rather symmetrically enlarged except for a slight transverse depression just above the umbilicus. At a glance the abdomen resembles a pregnancy at term, or past term. Circumference 92 cm. The abdomen is markedly distended and tense and there are no palpable masses such as fetal parts, etc. The anterior portion is dull on percussion; the sides tympanitic. The intraabdominal tumor reaches to the costal margins and interferes with the patient's respiration. Vaginal examination shows a nulliparous outlet with slight edema of the labia. The vaginal mucous membrane is cyanosed, cervix soft and patulous. Uterus is considerably enlarged and forced down into the pelvis by pressure from above. Ballottement of any uterine contents is impossible. Slight edema of feet and ankles present. Temperature, 102° F.; pulse, 120; respiration, 34; white blood cells, 35,000; polynuclears, 96 per cent; hemoglobin, 70.

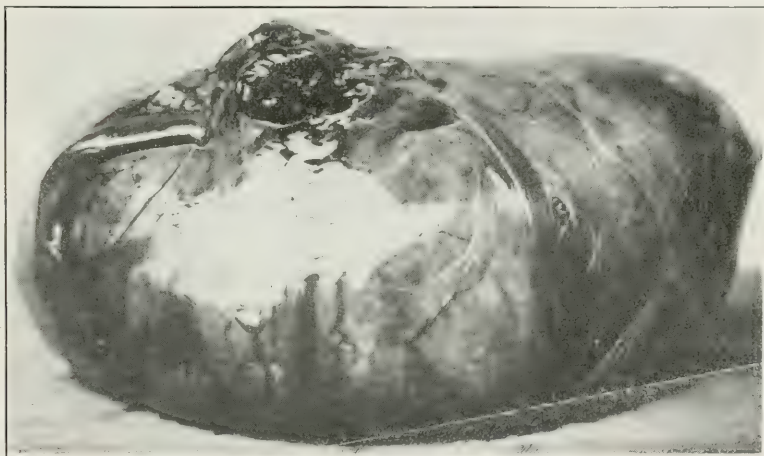


Fig. 1.—Ovarian cyst weighing twelve pounds, complicating a five months' pregnancy, showing enlarged tube spread out over tumor and blood clot at site of pedicle.

The grave condition of the patient indicated immediate operation for the relief of the obstruction without further attempts at making a definite diagnosis although several possibilities were considered, viz., intraabdominal hernia, strangulated tumor, concealed hemorrhage, etc. Operation done August 1, 1920, Cook Hospital, under nitrous oxide, oxygen and ether. Abdomen opened by fairly large incision through the right rectus, with the center at the umbilicus. Abdomen contained a moderate amount of free dark-colored fluid and was occupied by a large dark ovoid tumor resembling a uterus at term which was not adherent. The tumor evidently contained fluid, but was very tense. It was found to be pear-shaped and attached to the left horn of an enlarged uterus by a pedicle which was twisted twice. The uterus corresponded in enlargement to the supposed five months' pregnancy and was dark and mottled in appearance. Twenty-five hundred c.c. of dark fluid were removed from the tumor with a trocar, then its pedicle was clamped and the tumor removed easily and quickly. The pedicle was carefully ligated in three portions and,



without disturbing the uterus, the abdomen was closed in the usual manner. The operation consumed about twenty minutes and the patient was removed from the table in good condition. She was given sodium bicarbonate and glucose solution per rectum and morphine in small doses. She vomited only once. Peristalsis was established promptly and she passed gas readily. The bowels were moved by enema the following morning. Temperature dropped promptly to normal. It was hoped that her pregnancy would continue to term, but uterine contractions began in forty-eight hours after operation and a fetus measuring about 24 cm. in length was expelled. The placenta was removed easily six hours later. There was no excessive bleeding. The fetus was not macerated and had evidently died recently. There were no post-operative complications and the patient left the hospital on the twelfth day in excellent condition.

Examination of the specimen showed a large ovarian cyst with very rich blood supply. The tube was spread out over the surface of the tumor. Rather large blood clot in the tumor wall just above the twisted pedicle. When re-filled with the 2500 c.c. of fluid removed during the operation, it weighed 12 pounds. Size 33 x 26 cm., circumference 82 cm. The outer surface of the tumor was smooth and showed that there had been considerable hemorrhage into the wall. Section showed the tumor to be unilocular. The inner wall was rather granular in appearance and also showed extravasation of blood into the wall. There was evidently some hemorrhage into the lumen of the cyst. Fig. 1 shows the cyst and especially the blood clot above the twisted pedicle.

Examination of the fetus showed no abnormalities. The placenta presented one small white infarct and minute hemorrhages into the amnion of the placenta and cord.

PROFESSIONAL BUILDING.

## CANCER OF THE UTERUS IN YOUNG WOMEN\*

BY GORDON GIBSON, M.D., F.A.C.S., BROOKLYN, N. Y.

*From the Department of Obstetrics and Gynecology of the Long Island College Hospital*

**M**ALIGNANT disease of the uterus in women under thirty is of sufficient rarity to warrant a report of the following cases. One of these came under the care of Dr. Polak, one of Dr. Beck, and four of the writer.

It has been so long taught that cancer of the uterus occurs about the time of the menopause that, unless one is alive to the fact that it can occur at any age, an early case in a young woman may be overlooked because the "condition present was not considered."

It is only by continued repetition of the teaching that any undue vaginal discharge, bloody or not, demands investigation, with cancer in mind, and that any cervix which bleeds easily on examination or which shows any friability, should be considered as possibly malignant until proved not to be by microscopic examination, that this process can be controlled.

The writer cannot resist stating here that he believes that in a case where the diagnosis is clear, clinically, one in which there is a definite growth of the cervix, it is better not to wait for a microscopic report, but to operate immediately, as it has been his experience recently to see the process destroy the cervix and invade the parametrium during the week elapsing between taking the specimen and receiving the report. If, however, the services of a laboratory, properly equipped to make frozen sections, are available, this difficulty may be obviated.

Peterson<sup>1</sup> in a recent study of 500 cases of cancer of the uterus, found 23, or 4.8 per cent, of his cases under thirty years of age. Our percentage is higher, being 6 in 61 cases studied, or 9.9 per cent. This percentage will in all probability decrease as the series is extended. The value of statistical study is open to question. It is not so important how often cancer of the uterus can occur under thirty, as it is important to know that it does occur at that age.

No attempt is made in this report to discuss the results of treatment as the result of any method of attack of this disease does not so much depend on the method as upon the condition found. In other words, any operation, either abdominal or vaginal, which removes all the infiltration of malignant growing cells, will cure the patient, while any operation, either abdominal or vaginal that does not remove all diseased tissue, is a failure in that particular case. It is true that in some hands, more of the parametrium can be removed after isolation of the ureters by the abdominal route than by the vaginal method. Preliminary radiation should be carried out, if possible.

CASE 1.—Mrs. A. F., age twenty-five, admitted to the Gynecologic Service of the Long Island College Hospital on April 4, 1915. Her menstruation began at twelve, was regular

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every twenty-eight days and of three or four days' duration. She married at eighteen and had two children, three years and sixteen months of age. There had been a rather profuse leucorrheal discharge for the past ten years. Four months before admission, this discharge began to be blood stained on defecation and straining and had lately become very profuse. On admission the woman was very anemic and emaciated. Her blood showed 3,090,000 red cells with 44 per cent hemoglobin. The vagina was found entirely filled with a foul necrotic mass which was presenting at the introitus. The vulva and inner surfaces of the thighs were badly excoriated. On April 6, this mass was curetted away and the resulting crater cauterized with the electric cautery. The pathologic report was epithelioma. On April 27 the vagina was again almost filled with a cauliflower mass and the parametrium was badly infiltrated. She was again anesthetized and as much of the mass removed with the cautery knife as possible. On April 30, 50 mg. of radium were inserted and allowed to remain 24 hours. This was repeated on May 4, when again it was found that the growth was almost filling the vagina. She failed steadily and died on June 6, 1915. At autopsy the entire pelvis was filled with infiltrate.

CASE 2.—Mrs. M. S. Admitted to the service of Dr. Polak on Feb. 15, 1918. Age twenty-eight years. One sister died of cancer of the uterus at the age of thirty-one and her mother died of the same disease at the age of fifty-two. Her menses began at eighteen, were regular every twenty-eight days and of three days' duration. She married at seventeen and had three children, ten, eight, and three and one-half years of age. Her labors and puerperal periods were normal in every way. She had one miscarriage six years ago which was uncomplicated. Examination showed the cervix to be considerably enlarged and to be the site of a cauliflower growth of moderate size. There was some thickening of the left parametrium. On February 16 a radical abdominal hysterectomy was done. She left the hospital on March 8 with no evidence of infiltration.

CASE 3.—Mrs. L. G. Age twenty-nine years, colored, a patient of Dr. Beck's, was admitted to the hospital on Aug. 4, 1918. Menstruation began at fourteen, was regular every twenty-eight days and of two to three days' duration. She married at sixteen, and bore two children, now thirteen and eleven years of age, respectively. Both labors and puerpera were normal. She stated that she had noticed a general lowered vitality for the past few years. She had never had a leucorrheal discharge until two months before admission, when she noticed a foul watery discharge and at the same time, an occasional blood staining at coitus. Examination showed a small area of hyperemia in the middle of the posterior quadrant of the cervix. This area bled easily on examination. On August 6, Dr. Beck did a radical abdominal hysterectomy. The disease has recurred and the patient is now in a home for incurable cancer.

CASE 4.—Mrs. N. Admitted May 12, 1919. Age twenty-seven years. Her previous history is unimportant. She married at seventeen and had two children, the last four years before admission. She was perfectly well until January, 1919, when she noticed a bloody vaginal discharge on exertion. This increased in amount, she began to lose weight and grew progressively weaker. The vagina contained a large cauliflower mass and the parametrium was infiltrated to such an extent that no radical procedure could be carried out. The growth was curetted away the next day and the resulting crater cauterized. The pathologic report was epithelioma. She subsequently received two doses of 100 mg. of radium for twenty-four hours each, but the infiltration increased rapidly and she died in November.

CASE 5.—Miss H. Admitted June 3, 1919. Age twenty-eight years. Single. There was no history of cervical trauma obtainable, but there was some doubt in our minds about this. She was well until her period in December, 1918. Following this period, which began on the 27th, there was a constant bloody discharge which gradually increased in amount. She was admitted with a temperature of 103° and a pulse of 110, very anemic and septic. There was a large necrotic mass filling the vagina and the entire pelvis was infiltrated, being palpable above the pubes. A considerable amount of pus was evacuated from the cervix during the examination. It was thought that her general condition could be improved and she be made more comfortable if we provided drainage, so on June 6, as much of the mass as possible



was removed with the cautery knife. The pathologic examination showed epithelioma. She died three days later.

CASE 6.—Mrs. R. Admitted Sept. 15, 1919. Age twenty-five years. She had always been a strong and robust girl. She was married at twenty-three and had one child on Feb. 19, 1919. The labor and puerperium were normal. She menstruated normally in June. On July 8, one month later, she began to flow and continued to do so in varying amounts up to the time she was seen. Examination revealed a mass slightly smaller than an English walnut, slightly pedunculated, rather firm in consistency but which bled profusely at touch, springing from the posterior edge of the cervix. The cervix itself was intact and freely movable and there was no palpable thickening of the parametrium. On Sept. 16, we did a vaginal hysterectomy, removing a considerable cuff of vagina. The pathologic report was epithelioma. The vault filled in rapidly with healthy granulations and she received two applications of 75 mg. of radium of 24 hours each on Oct. 9 and 22. She was seen one month ago and her pelvis shows no evident return of cancer.

One of the striking points in these histories is the fact that the first four cases all married early, at nineteen, seventeen, sixteen, and seventeen. Of the five who have borne children, four developed their cancer comparatively soon after a pregnancy, sixteen months, three and one-half years, four years and five months.

In only three of the cases could a radical procedure be carried out with any hope of success, and in these the disease had given rise to symptoms for a comparatively short time, three months, two months, two months respectively, and in the first there was beginning infiltration into the parametrium.

In the others only a palliative operation could be thought of and all of them died shortly afterwards. In these the symptoms had been present for four months, five months, and six months, respectively.

#### CONCLUSIONS

1. Cancer of the cervix occurs with sufficient frequency in young women to make it imperative that the condition be kept in mind.
2. Epithelioma is the type generally found.
3. The growth is much more rapid than in older individuals and only when seen in the first three months can a radical operation be done.
4. The extension is especially rapid when the parametrium becomes involved and death follows comparatively soon.

#### REFERENCE

- <sup>1</sup>Petersen, R.: Age Distribution and Age Incidence in 500 Cases of Cancer of the Uterus, Surg., Gynec. and Obst., xxix, 544.  
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## GLYCOSURIA DURING PREGNANCY\*

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I HAVE been stimulated to write upon this subject because of the untoward results recently observed in the treatment of two cases of diabetes mellitus in the Obstetric Clinic of the University Hospital. Not since the year 1908 has this complication been given serious consideration by any American obstetrician. At that time J. W. Williams reviewed the literature and considered at length the various types of glycosuria.

J. Matthews Duncan was probably one of the first to interpret correctly the findings of glucose in the urine during pregnancy. In a paper on puerperal diabetes read before the London Obstetrical Society, he reported twenty-two pregnancies occurring in 16 women who had become pregnant while suffering from diabetes or had developed the disease while pregnant. Eleven, or 68 per cent of these women died within the following two years as a result of the disease, while 47 per cent of the children were lost. Offergeld in his monograph of 1913 reports sixty-three such cases with an estimated maternal mortality of 50 per cent and a minimum fetal mortality of 66 per cent, 56 per cent being stillbirths and another 10 per cent dying during the first few days of life. Joslin, however, in a recent paper has taken a much more optimistic view of the complication, although both his maternal and fetal deaths in the moderate and severe cases approach those of Duncan and Offergeld. From these statistics and those of the state of Massachusetts, which show that the frequency of diabetes has more than doubled within the past ten years, we can see that the disease is an important one to recognize.

In a review of 2,200 consecutive cases of the Obstetric Department at the University Hospital (Ann Arbor), where the patient's urine is examined at least once every week, I have been able to find cases of lactosuria and almost every type of glycosuria. Only in those urines in which there was a definite reduction of Fehling's solution, was sugar recorded by the examiner as being present. Of these 2,200 cases, 88 gave a test for some form of sugar during either pregnancy, labor or the puerperium, a frequency of 4 per cent, somewhat lower than the 5.57 per cent of Williams and the 10 per cent reported by von Noorden. The incidence in the several periods was as follows: pregnancy 68, or 77 per cent; puerperium 14, or 11 per cent; and pregnancy and puerperium 6, or 7 per cent. The reaction was found much more frequently in primiparæ, 75 per cent, than in multiparæ. This can be explained by the fact that almost 80 per cent of our patients were going through pregnancy for the first time. The relatively low percentage during the puerperium can be explained by the fact that frequently during the puerperium no urinalysis was recorded. The earliest appearance of sugar was the sixth month, except

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\*Read in abstract at the meeting of the Michigan State Medical Society, May 26, 1920.

in those cases of true diabetes, where the sugar was present either before or very early in pregnancy. In the majority of cases, however, the test was not positive until two weeks before labor.

I now wish to present from the records of the University Hospital several typical cases and a number of conditions which may be confused with true diabetes, and after a brief discussion of each case and a review of the literature, to attempt to draw certain conclusions of practical value.

#### LACTOSURIA

CASE 1. (O. B. No. 338).—Lactosuria in a primipara, age twenty-three, in excellent health, who four weeks before labor and six days postpartum gave repeated tests for sugar in her urine. At no time did this urine ferment or rotate the polariscope in the proper direction for grape sugar. Her labor was spontaneous and she gave birth to a normal full-term child.

There is no doubt that a certain percentage of all pregnant and puerperal women have some form of sugar in the urine. This in most cases is in the form of lactose, or milk sugar, and is due to a premature activity or engorgement of the breasts. In 3.5 per cent of the 2,200 cases it was found during pregnancy, the large majority of cases giving the test two weeks before the onset of labor. Wilcox has a somewhat lower percentage for the same findings, namely, 1 per cent, while Ludwig places the same at 46 per cent and, when the puerperium is included, Commandeur and Porcher have found lactose in 30 consecutive cases. During the puerperium lactosuria is most common especially at the time of engorgement of the breasts and again during the weaning period. Then the percentage of milk sugar excreted may approach 10 or even 25 per cent. In none of these uncomplicated cases has Schiller been able to demonstrate any increase in the blood sugar.

#### ALIMENTARY GLYCOSURIA

CASE 2 (O. B. No. 44).—The next is a case of alimentary glycosuria in a young girl, age twenty, who complained of no symptoms other than some frequency of micturition with passage of large amounts of urine. She was in the habit of eating considerable quantities of candy as well as drinking much water. The urine showed a specific gravity of 1.033 and one month before labor repeatedly reduced Fehling's solution and responded to the fermentation test. With a restriction of carbohydrates her urine became sugar free. She was delivered of a normal full-term child and went through an uneventful puerperium.

It is a well-recognized fact that the pregnant woman is less tolerant to carbohydrates than the nonpregnant woman. As has been demonstrated in this case, by simply reducing the carbohydrate intake, the sugar in the urine disappeared and remained absent following delivery. Norris has shown that in 37 per cent of pregnant women, there is a certain susceptibility to alimentary glycosuria, so that an ingestion of 60 grams of glucose will produce a glycosuria. There is, as Schiller and Slemmons have demonstrated, no hyperglycemia, but rather a low sugar tolerance due to either an increased adrenalin, thyroid or hypophysis function, or a lowered ovarian function, or it may be explained by an increased function of the liver, the result of placental ferments and elimination of fetal products as suggested by Reinhardt and McDonald. A few of these cases may actually be diabetes, the glycosuria be-



ing due to a very mild diabetes and evidencing itself only during pregnancy when diabetes is most liable to occur. The majority have none of these symptoms or findings of true diabetes and practically all of them clear up immediately after delivery. The important point in connection with this condition is to realize that it does occur and that when glucose is found in the pregnant woman it does not necessarily mean diabetes.

#### RENAL DIABETES

CASE 3 (O. B. No. 163).—A primipara, age thirty-five, who gave a history of nephritis with hypertension and angiosclerosis of the retinal vessels. The urine reacted for glucose two weeks before delivery and her blood sugar repeatedly was found to be 0.158 per cent, the upper limit of normal. She had at this time 2 grams albumin per litre and a blood urea of 0.0384 grams per 100 cubic centimeters. Her sugar excretion was uninfluenced by diet. The labor was uneventful except that she delivered herself of a macerated fetus with an accompanying infarcted placenta.

*Renal diabetes* was diagnosed in this case because the blood sugar was always within the limits of normal and her glycosuria uninfluenced by either increasing or decreasing the carbohydrate intake. She had none of the symptoms of diabetes mellitus. The most recent work by Foster and earlier work by Mann on the sugar content of the blood in these renal diabetics have proved that there is no hyperglycemia present. In none of these cases were they able to find more than 0.15 per cent. It is also interesting to note that this condition may recur during successive pregnancies while during the interval the urine is normal. Occasionally, the glycosuria may alternate or be combined as in this case with albuminuria. The amount of sugar excreted is rarely above 15 grams per day.

As yet no satisfactory explanation has been offered for this remarkable phenomenon. It is peculiarly characteristic of pregnancy and may be, as Nowak, Porges and Strisower have suggested, due to a hypersensitiveness of the kidney to glucose or it may be the result of a phloridzin-like substance as suggested by Caldwell and Bibb.

#### DIABETES MELLITUS AND SYPHILIS

CASE 4 (O. B. No. 2144), is one of diabetes mellitus due to syphilitic pancreatitis. This patient is a primipara, age nineteen, who became pregnant in July, 1919. Her family and personal histories up to that time are entirely negative. In December of that year she consulted the Detroit Board of Health because of a measles-like eruption over her entire body. There a diagnosis of lues was made and antisyphilitic treatment advised. Accordingly arsphenamine and mercury were administered. Following one of these treatments a routine urine examination showed glucose in moderate quantities. This was her first knowledge that she had any such condition as diabetes. She was then advised to enter the maternity clinic and did so on February 7. A physical and laboratory examination corroborated the diagnosis of syphilis. A general adenitis, pigmented scars on the right labium and a positive Wassermann were found. The uterus was enlarged to the size of a six months' pregnancy and the fetal heart was heard in the right flank. Chronic gonorrhea was also demonstrated.

The relationship of the glycosuria, blood sugar, diet and intravenous arsphenamine are indicated in the accompanying chart. The glycosuria and blood sugar had a tendency to drop simultaneously with the lowering of the carbohydrate intake and the arsphenamine injections.

On February 12, she was delivered of a seven months' stillborn fetus, which had died during labor. At this time she presented the only signs of acidosis. Her urine contained both acetone and diacetic acid in appreciable quantities, but no sugar. There was no hyperglycemia. During the first two weeks of her puerperium the diet was unrestricted. Consequently sugar appeared in her urine on the fifteenth day postpartum and the blood sugar ascended to 0.153 per cent. With a resumption of a low carbohydrate diet and antiluetic treatment both sugar findings returned to normal.

During the entire puerperium there was present an elevated temperature with tenderness and rigidity of the lower abdomen. About three weeks postpartum this complication had subsided sufficiently so that she could be transferred to the Department of Dermatology for further antiluetic treatment. Five weeks postpartum she suddenly developed symptoms of peritonitis which was diagnosed as due to a pelvic abscess. At this

### Relationship of Blood Sugar to Labor, Diet,

#### Case 4 Antiluetic Treatment and Peritonitis.

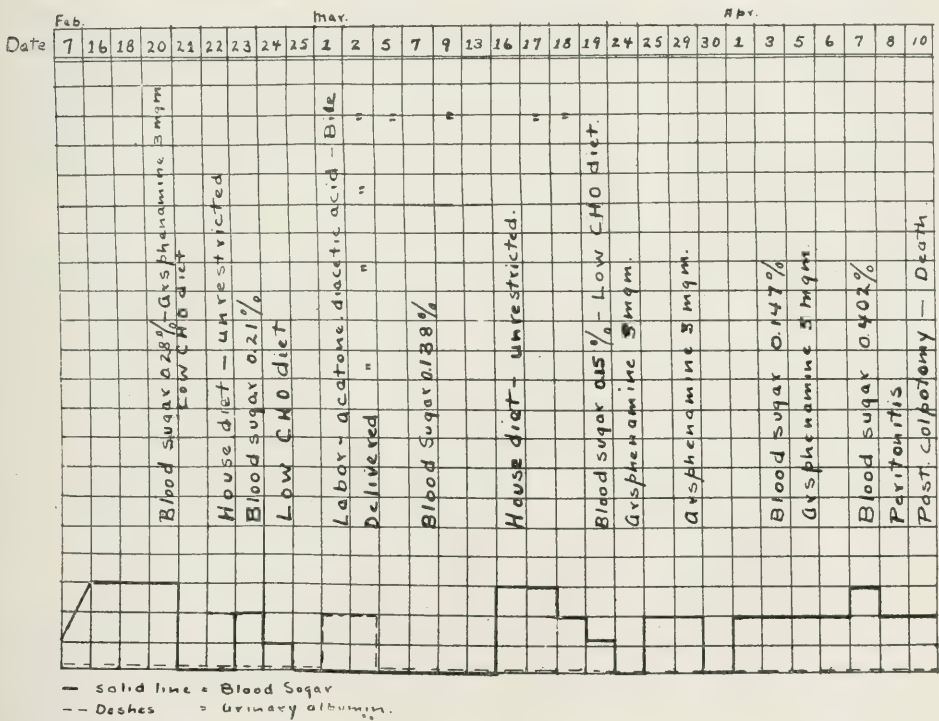


Fig 1.

time both her blood and urinary sugars were greatly elevated, but because of her critical pelvic condition, a posterior colpotomy was performed. She died about eighteen hours later with the symptoms of peritonitis rather than those of diabetic coma. At autopsy the diagnosis of death due to an old general peritonitis and a recent ruptured tubo-ovarian abscess was confirmed.

The premature labor with a stillborn fetus may have been due to both the diabetes and the syphilis. Since the placenta showed no positive signs of syphilis, and although the liquor amnii contained no sugar, and there was no hyperglycemia of the fetus, nevertheless, the type of labor with a living fetus just prior to delivery suggests that the fetal death was due to diabetes.

Certainly the indications in this case were to control the diabetes by two

definite lines of treatment; namely, dietary and antiluetic—the tolerance to carbohydrates being raised by the former, and the syphilitic involvement of the pancreas being limited but not necessarily repaired by the latter. The elevation of the final blood sugar can be explained by the general peritonitis and exhausted condition of the patient just before death.

In reviewing this history one might think that the puerperal fever in this case was definitely related to the ideal culture medium afforded by the glucose in the blood. Such is doubtful and can be better explained by an exacerbation of the old chronic gonorrhea from which she suffered earlier in her pregnancy. It is planned to report this case in greater detail from another point of view at some future date.

#### DIABETES MELLITUS

CASE 5 (O. B. No. 1031).—A mild type in a multipara, age thirty, who was admitted to the Obstetric Clinic, October 4, 1914. In 1910 she had one miscarriage of two months' duration, cause unknown. She has one living child four years old. For the past three years there has occasionally been sugar in the urine, but never of an amount sufficient to necessitate dieting. On admission to the clinic the history and examination showed that she was in her last month of pregnancy. The fetus was lying in the left occipito-anterior position and the fetal heart was heard to the left and below the umbilicus. There was a moderate edema of the ankles.

The urine was examined and both albumin and glucose demonstrated. The former disappeared the following day and did not reappear until the day of labor. The specific gravity was 1,054, sugar, 136 grams per liter or 17 per cent per 24 hours, with acetone++ and diacetic acid++. The tolerance to carbohydrates was then determined by placing the patient first on a von Noorden diet, then adding bread until it was found that she could utilize 200 grams per day without excreting sugar in her urine. As a result the specific gravity descended, the sugar and diacetic acid disappeared in five days, so that the only abnormality in the urine at the time of labor was a trace of acetone.

Although acidosis was not feared in this case because the carbohydrate tolerance was so high, nevertheless one dram of sodium bicarbonate was administered every two hours. This was discontinued as soon as she became sugar free and the acetone had been reduced to a trace. On October 29th she was delivered of a full-term living child. Two weeks later she was discharged, having gone through a normal puerperium.

When the patient left the hospital, she was given directions regarding her diet and I have learned through the kindness of her physician that she religiously adhered to this and as a result had no further difficulty with her diabetes until April, 1919. During that month she again became pregnant with the reappearance of sugar in the urine. This was estimated to be between 13 and 14 per cent and was accompanied with much acetone and diacetic acid and symptoms of acidosis. The same treatment which had been so successfully used in our clinic in 1914 was instituted. No improvement was noted, so after placing the patient on a starvation diet and after thorough alkalinization, she was eured under gas-oxygen anesthesia and a two months' fetus removed. For the ten days immediately following the emptying of the uterus, her general condition seemed to improve, but suddenly on the eleventh day postpartum she died in diabetic coma.

CASE 6 (Gyn. No. 11093).—Severe diabetes in a multipara, age forty, who entered the department of Obstetrics and Gynecology, January 1, 1920. The family history was entirely negative. In the personal history there are a few things to be noted. In 1916 she had a generalized edema of the body followed by polydipsia, polyphagia, polyuria, nocturia and excessive foul sweating. At this time her physician diagnosed diabetes and placed her on a modified carbohydrate free diet. In 1918 there were more urinary symptoms, namely, burning and smarting urination with intense itching of the vulva.

She was married at the age of seventeen, divorced twenty-two years later and re-



married in June, 1918. She had three children, two living. The first child is twenty-three years old, has never menstruated and weighs 287 pounds. The second is twenty years of age and has Pott's disease. The third was a six months' premature baby, the result of inducing labor for an unknown reason. Her menses have always been normal, the last period coming in May, 1919. Accordingly she should be entering her eighth month of gestation.

On admission to the ward a complete physical and pelvic examination was made. It showed a large-framed, well-nourished woman with normal heart and lungs. The breasts contained colostrum. The fundus of the uterus extended three fingerbreadths' above the umbilicus. The fetal parts and movements could be made out, but the fetal heart could not be heard. The vaginal outlet appeared relaxed, reddened and succulent. The skin of the

### Relationship of Blood Sugar to Diet and Acidosis.

Case 6.

Date	Jan 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Acetone		++	++	++	++	++	++	++	++	++	++	++	++	++	++
Diacetic acid		++	++	++	++	++	++	++	++	++	++	++	++	++	++
Blood sugar		0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
Diet		CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.	CHO Free Diet.
Notes															

— Solid line = Blood sugar  
-- Dashes = Urinary albumin

Fig. 2.

toes was markedly thickened and dried and both knee and biceps jerks were present. Her blood pressure at this time was systolic 120, diastolic 70.

A urine examination gave a specific gravity of 1.030, acid reaction with a very high percentage of glucose and acetone but no diacetic acid or albumin. Although she had always dieted moderately, she was immediately placed on a modified green diet which contained 11 grams of carbohydrate, 90 grams of fat and 17 grams of protein giving her 1050 calories a day. On this diet, within four days the sugar disappeared from the urine, leaving, however, very marked reactions for both acetone and diacetic acid. At this time the blood sugar was 0.15 per cent (normal) and, although her laboratory findings indicated a marked improvement, she became very restless and began to vomit. A consultation with the Medical Department gave us the following opinion: "Not a severe diabetic. Present gastric upset not believed to be due to diabetes. Would advise albumin water in spite of vomiting." This advice was adhered to for the next three days. Because the patient could retain nothing by mouth, rec-

tal feedings every two hours were instituted on the 9th. They consisted of 4 drams of sodium bicarbonate, 2 drams glucose, in 10 ounces of water. The urine showed no change, the blood sugar remained within the limits of normal, blood urea 0.0408 grams per 100 c.c., hemoglobin 70 per cent, white blood cells 7,600, blood pressure 128/80. On the tenth day her condition was decidedly worse. There was a rapid pulse with increased frequency of respiration and she expelled most of her rectal feeding. On this day albumin and hyaline and granular casts were found in the urine. Albumin water was again started by mouth and on the 11th nothing but this nourishment was given. It contained 80 grams of carbohydrate in the 22 ounces administered during 24 hours. Her tolerance for sugar evidently was greatly reduced for the urine quickly showed a heavy precipitate with Fehling's. Acetone and diacetic acid were present but the albumin and casts had disappeared. On the 12th food by mouth was retained as a result of receiving 217 grams of carbohydrate. This was followed by a striking improvement in her general condition, for on the following day only a trace of acetone and diacetic acid remained in the urine. On the 14th the urine contained a very large amount of sugar but no acetone or diacetic acid. The blood urea was .936. The fetal heart was heard, was regular and of good quality.

The following day at 7:30 A. M. she went into labor and at 8:40 P. M. delivered a premature, slightly macerated, stillborn fetus by the mechanism of persistent occiput posterior, followed immediately by a prematurely separated placenta. The blood sugars of both mother and fetus at this time had reached the high point of 0.8 per cent. The urine contained a large amount of sugar but no diacetic acid or acetone.

Following the delivery the patient's condition seemed to improve, but during that afternoon she passed into coma and at 8:45 P. M. of the day of labor died with all the symptoms of diabetic coma. The autopsy records kindly furnished in advance of the routine reports for the purpose of this article by Dr. A. S. Warthin of the Department of Pathology confirmed the cause of death mentioned above. The pancreas but more especially the islands of Langerhans (beta cells) showed the typical changes due to diabetes. It is interesting to note that there was an acute nephritis and also a perihepatitis with cloudy swelling of the liver cells.

#### DIABETES MELLITUS

The mere fact that the presence of sugar was first detected during the course of pregnancy by no means proves that it had not been present previously, but merely indicates that the condition was not accompanied by symptoms severe enough to necessitate the patient consulting a physician. In 66 cases collected by Williams from the literature, he found in 55 instances the disease present before pregnancy. In three of the four cases gathered from the records of the University Hospital the diabetes antedated the period of conception.

By almost all authorities, the complication of pregnancy in diabetes is considered much more serious than the appearance of diabetes in pregnancy. As was shown in the last case reported, that of pregnancy occurring in a severe diabetes of four years' standing, the outcome of both mother and fetus was most disastrous. Again, after reviewing the case preceding the last, where the diabetes although very mild, antedated the pregnancy, the patient, when placed on a proper diet went through a normal pregnancy and puerperium and was delivered of a full-term, living fetus. Five years later, while only two months pregnant, she succumbed to a diabetic coma.

As a rule patients do comparatively well for the first seven or eight months of pregnancy. Occasionally, as was seen in Case 5, they have a normal pregnancy, labor, and puerperium. More commonly and especially in the

severe cases they go into labor and deliver themselves as in Case 6, and those reported by Strouse and Fröhinsholz and others, of a macerated fetus or one which dies a few hours after labor, while the mother may apparently improve for a few hours or even days only later to develop coma. Occasionally they rally after such a complication and live a few years only to succumb to tuberculosis or some other intercurrent infection.

There are, however, a few cases of melituria on record, where, without change of diet, pregnancy seemed to benefit this condition. The glucose disappeared from the urine and remained absent throughout pregnancy but reappeared shortly after delivery. This is certainly the exception rather than the rule.

In reviewing the blood sugar determination on the cases reported one is struck by the marked variability. The reports ranged from those within the limits of normal to the enormous figure of 0.8 per cent. In the case of diabetes, syphilis and pregnancy the blood sugar, when the patient was placed on an unrestricted diet, was found to be 0.28 per cent. When the diet was restricted the hyperglycemia immediately dropped to 0.21 per cent and with the advent of antiluetic treatment and following labor a further reduction to within the limits of normal was noted. When the complication of general peritonitis developed the blood sugar rose to 0.402 per cent. The last case, that of a marked diabetic, is interesting because of the fact that throughout the entire pregnancy the blood sugar remained within the upper limits of normal; but as soon as glucose was administered the sugar preceding the onset of the coma reached the high point of 0.8 per cent.

There are many factors which influence blood sugar besides diabetes. Especially do infections and nephritis raise the blood sugar. That of infection is well demonstrated in Case 4, while the damaged kidneys certainly influenced the blood sugar in Case 6. As a rule blood sugar returns to normal under treatment. Rogers believes that a persistently elevated blood sugar is an indication of the severity of the disease or, if it occurs in mild cases, is generally associated with some renal impairment. Efficient treatment, however, can be carried out in most cases by using the urinary sugar as a therapeutic guide.

Acidosis in these cases is indicated by the presence of acetone and diacetic acid in the urine as well as by the symptoms of nausea and vomiting, restless irritability, rapid pulse and Kussmaul breathing and the amount of sodium bicarbonate necessary to bring about the excretion of an alkaline urine. Acetone and usually diacetic acid can be found, whenever there is an appreciable amount of mellituria and frequently, while the patient is on a starvation diet, even after the melituria has disappeared. More commonly acidosis is the result of a diet high in fats, even though the carbohydrates have been reduced to a minimum. Whether the acidosis in the last case reported was due to the von Noorden and later starvation diet or, whether it was the result of the high fat intake is a debatable point. I agree with Joslin, Strouse, Bloor and Tice, that the most important factor in the production of acidosis is fat and secondarily carbohydrates. Hence, in the treatment of these cases the



fats should be reduced to a minimum and entirely eliminated if necessary and the carbohydrates reduced to the point of tolerance.

Nowhere in the literature have I been able to find any consideration of the possibility of the production of a nephritis or exacerbation of a latent nephritis, by the feeding of such a relatively high protein diet, as is indicated in the treatment of diabetes. Newburgh has shown conclusively that in animals an acute nephritis can be brought on by continuously feeding a high protein diet. The same may be true in man. At least it is within the range of possibilities. In pregnant women we know that the most common complication is albuminuria. In practically all cases this is the result of a renal destruction due to one of the toxemias of pregnancy or a true nephritis. It is interesting to note, that in the four cases of diabetes complicating pregnancy gathered from the records of the University Hospital, in all there were signs and symptoms of renal impairment and in the two which came to autopsy reports of some renal pathology. Why then is not diabetes and nephritis during pregnancy ever more of a serious complication than is usually realized? Here we have two diseases which require absolutely different dietary treatment. The one requires a diet low in carbohydrates and fats, while the other should have a minimum of protein. Epstein describes one type of nephritis where there is a high lipemia with a reduction of protein but a percentile predominance of the globulin in the blood. In these he advises the feeding of a high protein diet. As yet the average practitioner has not been able to recognize this type of renal disease and consequently this observation is of little importance to him.

In none of the cases observed in the clinic or in those reported by the various authorities does there seem to be an increase in the morbidity during the puerperium. Although the blood in this complication is supposed to afford an excellent culture medium to organisms, nevertheless, an immunity seems to be conferred to the patient by the acidosis which so commonly accompanies the puerperium.

There is no contraindication in the milder cases, as was shown in Case 5 where a living baby was secured, to the nursing of the child by the mother. It affords a certain amount of diversion for her and in this way offsets the depressed mental state and thereby lessens the demand upon her metabolism.

During pregnancy the patient should be constantly under supervision, and on first consultation should be treated in accordance with one of the methods outlined by Joslin, Allen, Strouse, Beattie or Woldert. These consist either in immediately placing the patient on a starvation diet as advocated by the Allen school, or instead, in using the more conservative gradual reduction of fats, proteins and carbohydrates as advised by the others. In the milder cases, as in Case 5, the omission of fats, bread and sugar will usually free the urine of glucose. Then within a few weeks a tolerance to 125-150 grams of carbohydrate can be secured, after which, provided the urine remains sugar free, protein and fat sufficient to retain the normal weight of the patient can be added. These cases will usually go through an otherwise normal pregnancy and puerperium.

It is the more severe cases, such as Case 6, which ought to be considered in greater detail, since the treatment is more difficult. Here the usual medical treatment combined with surgical interference, if necessary, must be employed. Such interference depends upon the viability of the child and also the response of the disease to medical treatment. In every case the following measures should be observed before any other interference is considered; immediate omission of fats, gradual reduction and final omission of protein, followed by continued reduction of carbohydrates with fasting eventually if necessary. In a gradual reduction such as this, one is much less liable to coma. The urine having become sugar free, the tolerance for carbohydrates is then determined by gradually increasing the latter, until a point is reached just below that at which sugar is excreted in the urine. Next, the proteins are increased until the patient is receiving one gram of protein per kilogram of weight, or less if the carbohydrate tolerance is low. It is advisable to start the proteins before the carbohydrate tolerance has been reached, so that the normal is approached as early as possible. Fat is to be added only after the protein tolerance has been brought up to the required amount and the carbohydrate tolerance has been determined. As long as acidosis and glycosuria are present, the fat must be kept low. In every case one should attempt to feed 30 calories per kilogram of weight.

Other medical treatment of great advantage in combating the acidosis recommended by Sellards is alkalinization by the liberal administration of sodium bicarbonate, either by mouth, rectum or intravenously. Alcohol has been used with great benefit by Allen, Foster and von Noorden to guard against acidosis and also to make up the required calories for sustaining life.

After having employed the treatment outlined above one must act according to the viability or nonviability of the child. Before viability the indications sufficient to terminate the pregnancy in the most conservative manner are (1) an albuminuria, (2) an inability to raise the tolerance so that the patient is receiving 30 calories per kilogram of weight, (3) a persistent hyperglycemia, (4) a persistent acidosis, (5) a history of aggravation of the disease during previous pregnancies. After viability most authorities, chief among whom are Williams, DeLee, Fröhlinsholz and Lesse, advise waiting, with the employment of medical treatment and inducing labor only when threatening symptoms, such as those mentioned above, plus hydramnion and progressive weakness appear. According to these authorities labor should be brought on by rupturing the membranes, packing the cervix or introducing a balloon or bougie and then permitting the patient to deliver herself. Recently, however, DeLee, Strouse, Joslin, Caldwell and Bibb have, after preparing the patient as for a surgical operation by reducing the hyperglycemia and thorough alkalinization, used Cesarean section to advantage. Of course this method of emptying the uterus should be considered only in those cases where there is a living child in good condition. The section should be performed under gas-oxygen anesthesia and by an experienced operator. The accompanying shock is probably no greater than that of labor and the exhaustion much less. It has the added advantage of affording an opportunity for sterilization of the mother at the time of delivery.

## SUMMARY AND CONCLUSIONS

1. A positive reaction with Fehling's solution during pregnancy does not necessarily indicate the existence of diabetes mellitus but is usually due to a lactosuria or alimentary glycosuria and rarely to renal diabetes.

2. Lactosuria is common during both pregnancy and the puerperium. It is entirely physiologic and must be differentiated from the various types of glycosuria.

3. A large number, 30 to 50 per cent, of pregnant women are less tolerant to glucose than nonpregnant individuals. They have no hyperglycemia and are not true diabetics.

4. Glycosuria may be due to a lowering of the renal threshold for sugar. Albuminuria and glycosuria may accompany one another or alternate without hyperglycemia.

5. Diabetes and albuminuria may accompany one another. This complication in pregnancy is an ominous one and calls for the immediate interruption of pregnancy.

6. Diabetes and syphilis may complicate pregnancy. The treatment indicated is both dietary and antiluetic.

7. Pregnancy may occur in diabetic women or diabetes may become manifest during pregnancy. Either is a serious complication. Many patients do perfectly well, but a considerable percentage die in coma or collapse or succumb to some intercurrent infection or die during successive pregnancies.

8. The fetuses of diabetics, leaving out of consideration abortions and premature deliveries, are stillborn or die within a few days following birth in about 50 per cent of the cases.

9. Fat is the most important factor in the production of acidosis. It should be reduced to a minimum or omitted entirely. Its only use is in bringing the caloric requirement of the patient up to normal.

10. If sugar appears to a slight degree in pregnant women it should be carefully watched and controlled by diet and, unless a carbohydrate equilibrium can be maintained, pregnancy should be terminated. The advantages of Cesarean section under gas-oxygen should be kept in mind.

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UNIVERSITY OF MICHIGAN.

## TOXIC VOMITING OF EARLY PREGNANCY\*

BY R. T. LAVAKE, M.D., MINNEAPOLIS, MINN.

**C**LINICAL observations on the early vomiting of pregnancy led me in 1917, to begin an investigation, which has proved of negative value only. I will, however, take the liberty of reporting the results in the first part of my paper and will then pass on to observations of greater practical value, from the standpoint of treatment.

These observations were: that in many instances a husband could not be used as a donor for his wife in blood transfusion and, that in many instances, a woman will have severe nausea and vomiting in successive pregnancies with one husband and little or no nausea and vomiting in pregnancies with another husband. This marked difference in pregnancy with different husbands, in the face of a problem about which we have as yet much to learn, seemed worthy of attention, notwithstanding the fact that pregnancies with the same husband frequently differ in point of presence or absence of nausea and vomiting.

Knowing as we do that the cells of the offspring are the composite of cell characteristics derived from paternal and maternal elements, it seemed a fair hypothesis that the marked differences shown in the reactions of the mother might be due to the differences in the toxicity of substances elaborated by the ovular or embryonal composite as the result of impregnation from different parental stocks. Coincident with these observations I found so many incompatible blood groupings between husband and wife in cases of severe vomiting that I thought some parallel might exist. It seemed worth while to investigate the matter, because from the standpoint of treatment such investigations might provide guides in cases where therapeutic abortion was under consideration and might lead to improved serum or antianaphylactic therapy accordingly as the condition was found to depend on a definite toxin and the final establishment of an active immunity or a state of sensitization resulting in anaphylactic phenomena.

The investigation has shown that no parallel exists between compatibility and incompatibility of blood groupings of the husband and wife and the absence or presence of severe nausea and vomiting. For every case found of severe nausea and vomiting where the husband's blood grouping was incompatible with that of the wife, could be found a case with little or no nausea or vomiting. On the theory of immunization this would not be conclusive, however, but lately one case terminated in death in which both the wife and husband were Group IV and his blood was used for transfusion, without the slightest reaction, before instituting therapeutic abortion. This seemed to show that the grouping of the husband and wife can be of no aid in determining the absolute necessity of therapeutic abortion.

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\*Read at a meeting of the Clinical Club of Minneapolis, May 6, 1920.

Knowing, from the work on infant grouping by Dr. Rood Taylor of this city, and others, that it is impossible to predict the grouping of an infant from the grouping of either the father or the mother, I thought it might be possible that, though definite grouping develops only after birth, we might predicate a predetermination of grouping, as in regard to sex, and we might find that the presence of nausea and vomiting bears some relation to the grouping of the child, if not to that of the father. In the few cases that I have been able to follow, I have found that no such relation exists. Pernicious vomiting was present in pregnancies where the final grouping of the offspring after birth was either compatible or incompatible with that of the mother. One case now under observation is important as disproving any relationship between grouping and vomiting from all angles. This woman has just recovered from a severe attack of toxic vomiting in which a therapeutic abortion was under advisement. Both she and her husband are in Group IV. In two former pregnancies with the same husband vomiting was so severe that therapeutic abortion was under advisement. The children of these former pregnancies are both in Group IV.

Let us now pass on to observations that have led to the accentuation of treatment that to me has proved of marked value.

The nature of the toxin or antigen, the cells from which it is derived and whether the resultant symptoms are purely the toxic result of the antigen on important organs or the result of sensitization and anaphylaxis in addition, are moot questions. Whatever the nature and *modus operandi* of the toxin, it is fair to assume that any abnormality that may increase absorption, decrease elimination and increase the general sensibility of the nervous system in a condition where prominent symptoms point to a reaction of nerve centers leading to a vicious cycle of starvation phenomena, may turn the balance against the patient. It is my belief that this is the reason why local measures, psychotherapy and all aids to general good health and a normal nervous system, have at times cured the condition in a striking manner and out of all seeming proportion to the actual changes that each particular measure could accomplish. Reflex and neurotic factors should not blur the evidence of the probable real cause, a toxin.

The subject has been attacked from the standpoint of immunity and sensitization, with reported success. It has been stated on excellent authority that good results have been obtained by treatment with the blood of women who have just recovered from the toxemia. I have had no experience with this method. At present it presents certain practical difficulties obvious to all. The successful use of corpus luteum, as advocated by B. C. Hirst, has been verified by many authorities. Reported failures and personal failures may be due to incorrect administration or to inert substance. It is a development that should receive our attention. I do not intend giving a résumé of all theories with the rationale of treatment used in this condition. I have mentioned the above types because they throw light on two fields of investigation that to my mind offer the greatest hope of future advance in this toxemia of pregnancy, namely, immunity and anaphylaxis. At present in the light of



all clinical and comparative experimental data these fields are still obscure in their relation to this subject.

I wish to point out a certain parallel between anaphylaxis in animal experimentation and the early vomiting of pregnancy and a parallel of treatment. Though this parallel may be fortuitous, I have found the treatment to offer the greatest chances of success in pernicious vomiting short of therapeutic abortion. In both conditions we have a heightened nervous sensibility with a storm of nerve centers. In both conditions we may have all four of the following symptoms; nausea, vomiting, salivation and acute abdominal pain. If an animal be sensitized to a foreign substance and then held under the influence of a drug such as ether, alcohol, chloral hydrate, etc., (not morphine or its derivatives) that reduces the nervous sensibility, during the period of the action of the drug a lethal dose of the substance will produce no anaphylactic phenomena and the animal will recover from the influence of the drug unharmed. Of all types of treatment short of therapeutic abortion in pernicious vomiting it has been my experience that a parallel reduction of nervous sensibility by bromides and chloral hydrate has led to the most frequent success. Such treatment has been used by the profession for many years. The most frequent cause of failure is that the drugs are not given in sufficiently large doses. If we can stop the vomiting for twenty-four hours, judicious resumption of feeding by mouth usually meets with success and recovery obtains where patients are brought in apparently *in extremis* and where it has been thought that therapeutic abortion was imperatively indicated. I bring out this parallel between the treatment of sensitized states and the treatment of pernicious vomiting because in a condition where no unanimity in the theory of origin exists it may prove of value in future experiments and because the practical application of the treatment in pernicious vomiting does prove of marked value. At present I can only explain the beneficial results of lowering nervous sensibility by the cessation of the exhaustion previously caused by the constant vomiting and loss of sleep and by the elimination of starvation phenomena. It is a clinical fact that even after vomiting ceases, the patient may die apparently from the action of the toxin on vital organs. What I wish to emphasize is that success often follows previous failure in the sedative treatment when heroic dosage is used and when certain finesse in administration is practiced. To be explicit, I will outline the routine line of procedure in such a case.

By history and physical examination establish the diagnosis.

Correct any malposition of the uterus and treat judiciously any manifest pathology in the pelvis.

Establish treatment of mouth infections and see to it that the teeth are kept clean. Use any pungent tooth paste that leaves a clean taste in the mouth of that particular patient.

Put the patient to bed in a quiet, well-ventilated room, prohibiting the visits of relatives or acquaintances. A hospital where strict regulation can be obtained is better than the home. Put in attendance a capable nurse.

Cease all administration of fluid and food by mouth.

Give a soap suds enema every four hours in the first twenty-four if the

patient is awake and after each result place in the rectum six ounces of equal parts of a 10 per cent glucose and 5 per cent soda bicarbonate solution containing sixty grains of sodium bromide. Be sure to induce sleep at night by the addition of from fifteen to thirty grains of chloral hydrate to the 8 P.M. administration and repeat this every four hours until sleep is secured. Be sure to give the enema and get a result before giving the medication. This not only clears from the bowel any decomposition products, but overcomes the extreme antiperistalsis that is present in many of these cases. The patient is manifestly more comfortable and will retain the drug better.

If severe dehydration is present, water should be given between drug administrations by proctoclysis.

Begin administration of food by mouth twenty-four hours after vomiting has ceased. Begin with a dry diet, low in fat and protein and high in carbohydrates, laying great stress on any preference of the individual patient. Water or water mixed with fruit juices if latter is more palatable may be allowed between meals.

The day after the cessation of vomiting reduce the administration of enemas and bromides to two, in the morning and afternoon.

If all goes well, on the next day give only the evening dose, then on each successive day reduce the amount in the evening administration by half. Be sure that the patient sleeps at night. I have found the evening administration to be the most important. The effects of the drugs have not worn off by morning when the nausea and vomiting are so apt to recur.

Do not allow the patient to raise her head from the pillow until a marked improvement is observed, and do not allow her to get up until her general condition has returned nearly to normal. Urinary findings, pulse and weight are good guides. If the pulse remains rapid, go slow. It is sometimes necessary to keep the patient in bed for weeks until immunity or the selective and protective action of the developed placenta or desensitizing internal secretions bring the process to a close. Experience shows that whatever the cause, it has a tendency to limitation about the fourth month.

This treatment can be modified according to the severity of the case. However, be sure that the initial doses of the sedative are sufficient to stop the nausea and vomiting as quickly as possible. In most cases the nausea and vomiting cease after the first dose. It is very important, I believe, that the nervous sensibility be tremendously reduced at once.

Watch the urine for sugar. A marked reaction calls for the diminution or removal of glucose.

If the vomiting continues or the vomiting ceases and the pulse continually rises to 110 or over, or the marked traces of acetone and diacetic acid appear in the urine, the gravity of the situation increases. Blood chemistry studies do not as yet clearly direct the course. Metabolism studies may in the future. Clinical experience and acumen together with general laboratory data are still our last guides as to the imperative need of therapeutic abortion.

Lately I have seen one case and heard of two others where after consultation had justified a therapeutic abortion, a simple cervical dilatation was performed with immediate improvement of the condition, and rapid re-

covery without abortion. This may have been a matter of chance, but other cases have been reported and it may be worthy of trial as a last resort before therapeutic abortion. Such a procedure should be subject to the same laws of consultation as therapeutic abortion.

When after consultation therapeutic abortion is definitely determined upon, I believe it is best to empty the uterus at one sitting by vaginal hysterotomy if necessary.

910 DONALDSON BUILDING.

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## THE UNMARRIED MOTHER BEFORE AND AFTER CONFINEMENT\*

BY FOSTER S. KELLOGG, M.D., BOSTON, MASS.

THE PROBLEM of illegitimacy is so large and many sided that we may as well admit in the beginning that all agencies other than the state or central government are in a measure inadequate for its solution. Scandinavian countries and France recognize the truth of this: each attempts a state solution according to its temperament and point of view. In Scandinavian countries, paternity established, the child is essentially legitimized and its father must support it until it can earn a living. In France if a child is illegitimate, it is not even legal to declare its father without his permission, but the State, if necessary or wise, becomes its adopted father and undertakes to rear it in the country without want and under state (official) supervision. Moreover, a trade is taught, and it is regarded as the legitimate child of its foster parents. We have not the frank viewpoint either of the one—that a man's responsibility for his children includes, under all circumstances, his illegitimate as well as legitimate children; or of the other—that the State must protect the blood integrity of each family to the extent of itself assuming the fatherhood of illegitimate children. It is interesting to note how each system reflects the country in many ways, but most strikingly in relation to woman's position in that country, for Scandinavia gave birth to the "new woman," while France is still a stronghold of the "old woman." Each recognizes frankly that illegitimacy exists as a State proposition and would feel that our attitude—on the whole that it is an occasional accident fit for private charity and not of state importance—is a hypocritical one. However, we have not the continental point of view or the Scandinavin either, neither is it proved that we should have, nor would their methods work with us. Nonetheless, our solution worked out in accordance with our temperament lies probably with the State, at least in part—certainly it lies in the future, though illegitimacy has been studied here for many years.

I have just referred to the bigness of the problem and I would impress this further with a few figures from Massachusetts. In a few years prior to the war, from four to five per cent of all registered births in Boston were illegitimate, in round numbers 850 births per year. In the same year, 2.5 per cent of births registered in Massachusetts were registered as illegitimate,

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over 2,000 births per year. These figures are, of course, smaller than the truth. In a twenty-year generation then, we have born in this State—and these figures show it is a state-wide problem, not a local one, especially as many of the Boston births are of outside Boston residence—between forty and fifty thousand illegitimate children at the least, with the probability that a correct figure is sixty or sixty-five thousand.

These children are economically worth to the State one hundred million dollars plus, if they become good citizens; if they become bad ones, besides the loss of the one hundred million they become a state expense along the routes of insanity, criminality, prostitution, etc., to an incalculable amount. It is fair to assume that the neglected child born out of wedlock has less incentive to go right than any other class. It is obvious that prostitution, criminality, and venereal disease are recruited from neglected women who have had illegitimate children. The infant mortality rate for 1914 for children born in wedlock was 95. The infant mortality rate in 1914 for children born out of wedlock was 281, three times as great. This means that between one-quarter and one-third of the infants born out of wedlock die before they reach one year of age. This represents so much economic waste. The chief cause of this high infant mortality rate is separation of baby and mother.

The number of deaths under one month, per thousand illegitimate births, was two times as high as legitimate births; at one month it was eight times as high; at two months six times as high. Another difference was very noticeable: the death rate from gastrointestinal disease was six times as great in illegitimate as legitimate babies. These figures show the seriousness of the state-wide problem of illegitimacy.

The first step in progress in the solution of the problem of illegitimacy in America depends on a reconciliation of two opposite or at least differing points of view. For lack of better terms these may be called the "Orthodox" and the "Social Service" points of view. It is not worth the space to trace the growth of these in the fields of illegitimacy, but it is apparent to any outsider touching the work that they exist, that they conflict, and that because they conflict they hinder progress. It is equally apparent that the "Orthodox" point of view sees illegitimacy in terms of *Sin* and that the "Social Service" point of view sees illegitimacy in terms of *Problem*. To the ordinary person of today, there is little to choose between listening to an exhortation before a gathering of illegitimately pregnant women on original sin and eternal damnation, and reading the wordy "patter" of some professional social service investigator on the "key-concept" to be unearthed in studying case records. Both seem equidistant from tangible results and on the whole their past records show this. The "Orthodox" point of view wishes soul salvation; the "Social Service" point of view seeks economic salvation—and the one is apt to criticize the other's work for putting stress on its own feeling in the matter. This hinders progress. They should realize that they are working for the same end and "get together."

It is hard for me to see that either is entirely right—saving a woman's soul may make her economically efficient, or at least willing to become economically efficient, or it may not; making a woman economically efficient may

make a woman save her soul, or willing to save her soul, or it may not; but, and I believe that this is the crux of the situation, before you can save her soul or make her economically efficient or both, you must discharge her after the birth of her baby only after such care and after such time that she may be self-supporting at work.

We may epitomize this one big outstanding fact by saying that, while it may be of no economic importance if a woman with a husband to support her and her child is left in poor shape after childbirth, it is the *sine qua non* for her economic salvation that the mother with no husband to support her and her child must be discharged in the most perfect health she has ever enjoyed. That she shall have faith and religion either restored or inculcated, if possible, is highly desirable, that she be helped economically and studied as a problem is also highly desirable—and I do not see that these necessarily conflict—but that she enjoys perfect health to work is essential.

We next consider how to attain this result under present conditions and with present existing facilities without taking the long and difficult step to complete State control.

We may pass by the use of boarding out in the carefully investigated family, except for the individual exceptional case; for, because of its diffuseness, this system obviously cannot attain the desired result. This fact becomes clearer when we see how much time must be used to attain it; and overlooking the occasional case where the girl's family wish to keep her at home and shelter and provide for her, we find Maternity Homes. By keeping these at a high level of staff—superintendent, teachers, doctors and nurses, and social service—we may obtain satisfactory results.

Let us consider the arguments in favor of the use of the present homes:

(1) The practical reason that they exist and would be difficult to get rid of, especially as they believe firmly in themselves and represent a large monetary investment; (2) that only in small institutions is it possible to get home atmosphere and personal contact with the home mother and her assistants; (3) that they are relatively efficient. (a) Of the 847 infants of illegitimate parents in Boston 49 per cent were born in hospitals, 25 per cent in maternity homes, 3 per cent in the public infirmaries, 23 per cent in private homes. Agency or death records show that 230 of 847, 27 per cent, had died before they were a year old. Of the infants born in private homes 24 per cent were known to have died; of those born in hospitals, 35 per cent; *of those born in maternity homes and the public infirmary, only 17 per cent.* (b) In the maternity home with which I am connected 425 consecutive mothers, from 1914 to date, have been confined without a maternal death. In this time twenty-five babies died, a rate under 6 per cent. Of these ten were premature. Only one case in six years died of gastrointestinal disease. The average post partum stay in the institution was ten weeks, so that while this death rate is not directly comparable, it does cover the first two or three months after birth.

The advantage of such maternity home care over that in the selected private home is that the woman and baby get two, three, or four months' good prenatal care, the best possible hospital care in labor, and the best postpartum

care, so that the mother is sent out—and this is fact, not theory, because she can go only on the physician's estimate that she is fit to work—in such state of health that she can support her child, and this is what her salvation and economic worth depends upon. In order to accomplish this properly, the following factors are needed: first, trained obstetricians and hospital facilities, for we have handled contracted pelvis, adherent placenta, toxemia of pregnancy with and without convulsions, hemorrhagic disease of the newborn, etc.; and in this series we have made our own necessary repair work, cleaned up tubes, and done other necessary pelvic and general surgery; it takes a trained pediatrician for the babies; it takes a dental staff, an internist, a surgeon, an eye, nose and throat specialist and a neurologist, as available consultants. It is hard to see how this can be reproduced for illegitimates except in a maternity home.

I have outlined this in some detail to show not only the high degree of efficiency it is possible to obtain, at least medico-sociologically, in the existing agencies, but to back my contention that unless the maternity homes can and will show a good record of accomplishment, they should cease to receive support, because a staff of high grade can be obtained for all of them. These results were obtained in a home originally and still fundamentally of the orthodox type but in which there is hearty accord between the trustees, superintendent, and the medical staff, and in which each group tends strictly to its own business, and in its own department is supreme; in a home inadequate to care for the various illegitimates it should care for, and to give its patients the exercise in the fresh air they should have as it is in a crowded, poor part of the city. Incidentally the staff is sufficiently large so that each man gives but little time in a year to the work and every man of the staff holds one or more, so to speak, major staff positions in bigger hospitals.

In an ideal home we should get better results with gardens and outdoor porches, and better facilities for handling babies, with a distinct house for caring for venereal pregnant illegitimates and a syphilologist added to the staff; with a bit more breadth of social service and a greater individualization and mental study of each case by the neurologist working with the social service, with a view to placing it most favorably; with a wider publicity, and a carefully individualized study of the adoption question; with rooms to take back mothers and babies after discharge—for illness or rest, or during temporary unemployment while placing in better or different work, so that each mother would return to us in trouble as to her real home—we should obtain results satisfactory for the country if such places were run in each community where needed. Further we must evolve some system of grading and typing illegitimates before we start work with them, so that we do not fritter away the high cost on useless material and contaminate the hopeful individuals with the hopeless.

The sanest solution to this end is to establish a State Clearing House or State Board for Illegitimacy.

This raises the question why, if maternity homes may be made to give good results, should there be a State Clearing House for Illegitimacy? Chiefly because there is little intelligence or rather little knowledge, and that not



coordinated, on which to base intelligence, shown in the distribution of types of illegitimacy. The different agencies each have an idea of the type it works best with. A clearing house for distribution purposes would give them that type, but chiefly a clearing house would sort out the mentally deficient. The mentally deficient illegitimate gets in everywhere. She is said to comprise from 40 per cent to 60 per cent of all illegitimates. She is a menace and a useless expense because good care for high grade illegitimates is very expensive. She should be sorted out and put where she has no opportunity to repeat. This a clearing house with a primary mental examination would do, and certain existing agencies could handle these cases. Also, take the question of venereal diseased illegitimates. These represent 8 per cent or more of Boston's illegitimates. Venereal disease is an accident accompanying illegitimacy. There is no valid reason for making it a distinction against good care, rather the reverse. Yet as matters now stand, the woman unlucky enough to be infected must go to a less desirable place than one who is merely illegitimately pregnant. The clearing house would care for them through some designated, existing agency. There are certain types, as the very young and the very wilful, who are better cared for in private homes than in maternity homes, both for themselves and for the institutions. These the clearing house would provide for through agencies already existing which are familiar with this type of case, as Children's Aid Societies.

This clearing house must of necessity be composed of representatives of each agency in so far as the placing of the case goes in the beginning, except that certain types like the feeble-minded and venereal cases will go directly to designated agencies. Only by this method will you prevent the jealousies of different participating institutions. Placed from this clearing house, the report on each case, followed for one year if possible with the end result, must come back from each agency for compilation and study. In five or ten years these accumulated data will have sorted the women into different types and will show what types are best handled in each way. In this way only can progress be made in the study of this great economic problem, and only in this way can we study prophylaxis of illegitimacy.

#### CONCLUSIONS

1. That illegitimacy is a state problem.
2. That at present little or no progress is being made with the problem in this country.
3. That the best form of care for high-grade illegitimates requiring care outside their own homes—with a few exceptions—under present conditions, is the well-equipped, well-staffed maternity home.
4. That the worst form of care under present conditions for illegitimates—with a few exceptions—is a public lying-in hospital or maternity wards in public or semipublic general hospitals, because they are usually taken in only in labor and discharged too early.
5. That the best form of care for low-grade illegitimates—with a few exceptions—under present conditions are the state institutions.

6. That the medical and social service standing of the maternity homes be kept to as high a degree of efficiency as possible under State Board of Illegitimacy supervision.

7. That the chief reasons for lack of progress are inadequate facilities for sorting, distributing and recording end results, and for coordinating effort, expense and machinery.

8. That such machinery may be obtained from a central clearing house composed of a representative of each agency, under the directorship of a long-time chairman, with the necessary physicians, social workers, and clerks.

9. That the cost of such a board should be supplied by the agencies interested, including the Commonwealth.

10. That in addition to the fact that a clearing center would reserve only the worth-while-working-over woman for the more expensively run agencies, it would be of equal or greater use economically in early segregation, and early observation of a large number of mentally deficient whose first tangible evidence of their mental condition is pregnancy.

11. That the problem of illegitimacy is big enough to be handled and should be handled as an entity—directed legally, sociologically and medically—loosely at first until knowledge is accumulated—under one office; that any legislation, as for example, a proposed Maternity Pension Bill, should not include clauses concerning illegitimacy because it will increase the present too great decentralization and so add to the present confusion.

19 BAY STATE ROAD.

## THE PROBLEM OF THE EXPECTANT MOTHER IN RURAL COMMUNITIES\*

BY LOTTIE G. BIGLER, M.D., ARMOUR, SOUTH DAKOTA

A PHYSICIAN from the city starting out in a village and country, encounters many problems and difficulties. I well remember my first year in rural practice. Many times, I have been discouraged and felt helpless, for there is absolutely no cooperation among physicians in rural communities.

I will try to tell you of some of my experiences and describe to you some of the problems of expectant mothers in the community in which I practice and will give you some possible solutions of these problems.

The average rural home is a disgrace to civilization. It is usually small—very inadequate to properly house the large family which we usually find. There is improper sewage disposal, poor water, probably contaminated by sewage. Often the sewage from the barn or privy seeps into the well. These are often located so that there is direct drainage into the well or cistern.

I know a family of fifteen children who live in a two-room house. All of these children were born in this house and the only care this mother ever had was what her husband and older children gave her. They were so isolated that even the neighborhood midwife did not get there. During the mother's last pregnancy, as she did not feel as well as usual, she consulted me. I found albuminuria present. I warned her and tried to instruct her. I thought, probably, I had made no impression on her but she became so worried about herself that she sent her husband to engage me for her confinement. He was rather disgruntled about her new-fangled notion of wanting a doctor. His mother had never had one and she had had fourteen children. His wife was a strong woman, did all her own work, and even helped him in the field. But he was good to his wife and would not be stingy with her and would give her her own way this time. The baby arrived in due time and I was not called. When I questioned them in this regard, the husband said it was just too far to call a doctor out and the roads were bad and besides, they didn't need any help.

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NOTE. Although, in a sense, Dr. Bigler's article cannot be termed technical, the editor desires to present it to the readers of this Journal for several reasons. It is a frank record of personal experiences that, although generally accepted, are not sufficiently appreciated,—a record that unfortunately discloses the low plane of obstetrics among what may be regarded as an ignorant but nevertheless large and important part of our population. This lack of interest and appreciation by the rural community of proper obstetric care is correspondingly reflected in the profession. An improved point of view in one class must go hand in hand with that of the other. The importance of parturition and its consequences must be impressed upon the lay, as well as the professional, mind and this can only be accomplished by instruction; by extending the facilities for safe delivery, including town and county hospitals, visiting nurses or trained attendants, and above all, by cooperation between the rural practitioner and his, perhaps, more fortunately situated, urban colleague. The mortality and morbidity of childbearing still remains alarmingly high, but the facts are now becoming impressed on the national conscience. The need for better obstetrics is evident from the paper of Dr. Bigler and of others. To overcome the unfortunate state of affairs referred to, publicity above all things is essential, not as manifested by temporary hysterical agitation, but by a plain statement of facts. That such publicity will bear fruit is the firm belief of the Editor and will influence him in presenting papers of this and of similar character in the pages of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY as opportunity offers.

\*Read at a meeting of the American Child Hygiene Association held at St. Louis, October 11-13, 1920.



With each pregnancy, these women work harder, for there is one more to care for and possibly more hired men to cook for, with no provision for hired help in the house. The food is not always what a woman needs. Her diet consists largely of pork and potatoes. The butter, cream, and eggs are sold to buy more quarter sections of land. There is no lack of funds among the farmers in the rural districts in which I am acquainted. What these people need is education so that they may see the necessity in diverting some of their funds to care for the mother of our next generation and thereby, give the unborn a better chance in life.

According to statistics taken from the rural communities of six different states, eighty per cent of the pregnant women have received no advice or instruction during pregnancy. This percentage is even higher in some localities. At least half of the women do not engage a doctor before the last month. Many that do, merely announce the fact to the doctor either over the telephone or by letter. I do not think the laity are entirely to blame, for many women have told me they had asked their doctor if a urinalysis ought not to be made and the doctor had said it wasn't necessary. We general practitioners need to be stirred up, for I believe we are all guilty of laxness. If we would seize every opportunity, a great deal might be done toward educating our patients. A case of mine illustrates the ignorance of some of these people. I was called out in the country fourteen miles, over almost impassable roads, to see a German woman. The husband had driven several miles to telephone, as they had no telephone themselves. He reported that she was not very sick—that she only had a little rheumatism in her back. I found her all alone in the two-room shack. All but one of the windows were boarded up to keep out the winter cold and incidentally all the fresh air. Two fires were going full blast and the temperature of the room was at least 90 degrees. The woman was lying on the bed. I immediately sized it up as a case of nephritis with threatened eclampsia. Before I left, the husband returned and I explained his wife's condition to him. He seemed very much surprised to think that this had to happen to his wife, and he liked even less the expense of having a nurse and a housekeeper.

Isolated families, some of which are seventy-five miles from a doctor are the ones who present the greatest problems. Many of them depend on ignorant midwives for their care and instruction. Often the woman dies before they get a doctor there. Many of these farmers are foreigners. They need help badly and are the hardest to reach, for they look with suspicion on any innovations. The mothers often work in the field up to the last minute, performing most arduous tasks. It seems to me that the expectant mother in the barnyard gets far more attention and better care than the one in the house. If she gets sick the whole household is upset, especially if she be a pedigreed animal. The farmer sends for miles to get the best veterinarian. The State provides free courses on how to keep the animals healthy and how to produce the strongest offspring. I am reminded of a man who came to engage me to attend his wife who was near term. He said she hadn't been

well for the whole nine months. I asked him why he hadn't consulted a doctor about her. He said he didn't think there was any need. He supposed they had to feel badly the nine months, she always had during her other pregnancies. In the course of the conversation, he asked me how much I charged. I told him my fee. He said that was ten dollars more than he paid three years before. I informed him that all fees had been raised. He said he believed he could get it done at the same price he paid before. He said "I would like to have you. You have been recommended so highly, but you can't blame me for saving ten dollars if I can." I said, "No, I can't blame you if you have no choice of doctors, perhaps it will be all the same to you to get the cheapest." He said if he couldn't get it done cheaper, he would be back and engage me. I heard afterwards that he dickered with an old retired doctor and finally got him to agree to come for the fee he paid three years ago. I wanted to suggest to him to advertise for bids, lowest bid gets it regardless of qualifications. This man owns a half section of land worth \$150.00 per acre, and his crop this year is worth about six thousand dollars.

Another example: The husband came in to engage me for his wife's confinement. When I questioned him, I found out his wife was not at all well. I suspected nephritis and advised him to bring her in for an examination or at least have a urinalysis made. I never heard from them until about the end of term and got an urgent call. I found her in convulsions and delivered the baby. The mother died soon after delivery and it was with difficulty the baby was saved. The husband couldn't be made to see the need of these new ideas. He thought it was the doctor's modern method of profiteering. He also remarked he was sorry to lose his wife as she was a good cook and could milk more cows than he could.

I wish the mothers could be instructed on making layettes. Many times the infant arrives with very little, if any, provision made for clothing. They argue that if it lives, they can get things at the store. So many seem to expect the babies to die at birth or to be stillborn. The percentage of deaths is high and I think it is due largely to the fact they expect it so and do not do the things necessary to prevent infant mortality. I find that among those who do provide clothing of sufficient quantity, the materials are not right. I have seen one outfit after another without a thread of wool in any of the garments. I maintain wool is very necessary in a layette.

No small part of the problem in rural communities is that of the unmarried expectant mother. Sometimes it seems that illegitimacy is on the increase. During my first six months in the community where I am practicing, eight girls came to me pregnant from two to eight months. I suppose more come to me than to the other physicians because women in the profession are scarce in this State. They probably think a woman will be more apt to help them out of their difficulty. I have succeeded in talking many of these girls into choosing the honorable path. If only more could be reached, many tragedies might be averted.

No doubt, these problems of expectant mothers in rural communities have to be approached in different ways, in different communities. The crying need is for nurses trained for rural work. The average nurse born and

raised in the city, is unable to adapt herself to rural conditions. One nurse for a county is insufficient. There should be enough nurses so that all homes could be visited and individual instruction given. Health centers and free clinics should be organized with the school house as a meeting place. Sterile supplies could be provided at cost. The school teacher could give some instruction if she were capable. We must have public health inspection in the rural homes. Here often by chance, we discover contagious diseases raging with no effort made at isolation of the sick and in most cases, it is not even reported. By special legislation, we might accomplish much. The Sheppard-Towner bill may help solve these problems effectively. At least, it would do much to protect the prospective mother and her infant. We must face these problems squarely and do all in our power to give the expectant mother and the unborn infant the best possible chance.



# Society Transactions

AMERICAN GYNECOLOGICAL SOCIETY. FORTY-FIFTH ANNUAL  
MEETING HELD IN CHICAGO, ILL., MAY 24, 25 and 26, 1920

(Continued from November Number)

DR. RICHARD R. SMITH, of Grand Rapids, Mich., read a paper entitled **Hemorrhages into the Pelvic Cavity Other than Those of Ectopic Pregnancy.** (For original article see page 240.)

DR. JENNINGS C. LITZENBERG, Minneapolis, Minn., presented an extended lantern demonstration illustrating the subject of **Microscopic Study of Ruptured and Unruptured Tubal Pregnancy.** (For original article see page 223.)

## DISCUSSION

DR. J. WHITRIDGE WILLIAMS, BALTIMORE.—The only personal experience which I have had with conditions referred to by Dr. Smith, has been in two cases of intraperitoneal hemorrhage due to bleeding from fresh corpora lutea. Both patients were operated upon. In one the ovary was removed, while in the other the bleeding corpus luteum was excised. Concerning the other matters which Dr. Smith has mentioned, I have had no personal experience, except in the case of ovarian hematomata. Concerning their origin I know nothing and I regard it as one of the problems which is in urgent need of study and revision.

The method of study chosen by Dr. Litzenberg is highly desirable and one which affords us very accurate and important information. For years I have done the same thing and a great part of my knowledge concerning the histology of extrauterine pregnancy has been gained in that way. It is a pity that many of his specimens were not more highly magnified, for owing to the lack of detail it was sometimes difficult to judge the correctness of his description. In general, his specimens illustrate conditions with which we are familiar and which show well what happens.

The great difference between uterine and tubal pregnancy lies, as he has quite correctly said, in the abundant decidual formation in the uterus and its scanty formation in the tube. As you know the uterine decidua forms a thick and continuous membrane, but in the tube we never see such a structure, and the most we observe is the presence of a few isolated decidual cells. I agree with him when he says that in general the further we get away from the site of the tubal pregnancy the more abundant the decidual cells become; for in every instance in which I have seen a marked tubal decidua it has been in the nonpregnant tube.

My students are taught that the function of the decidua is three fold; first, to afford a nidus for the implantation of the ovum; second, to afford a medium of nutrition for the ovum until the placental circulation has become established, and third, and quite as important as the other two, to prevent the invasion of the uterine wall by the fetal tissues. Indeed, in the rare cases of spontaneous rupture of the uterus occurring in the early months of pregnancy, we practically always find the condition associated with imperfect decidual development.

I take it therefore that one of the very important functions of the uterine decidua is to prevent erosion of the maternal tissues. In the tube we do not get a well marked decidual reaction and consequently the outcome of tubal pregnancy differs markedly

from uterine. In both uterus and tube, we believe that the egg is implanted in the same way and, passing through the epithelium, burrows into the tissues beneath it. In either event it dissolves away the cells immediately in contact by its trophic action. In the uterus it sinks down into decidual tissue, but in the tube it passes directly down into the muscle and connective tissue and this makes a wonderful difference. In both uterus and tube we find the periphery of the egg surrounded by a zone of degenerate tissue, the so-called canalized fibrin. In the uterus this remains sharply marked off from the decidua, whereas in the tube the fetal tissue comes in direct contact with the maternal and produces a widespread destruction, the chorionic trophoblast invading the tube wall like a malignant growth.

When I first began to study extrauterine pregnancy, which was before our present ideas concerning the implantation of the ovum were established, I was very much interested to find that in all of the early cases the ovum lay entirely outside the lumen of the tube. At that time we believed that implantation occurred on the surface and the egg became gradually walled off from the lumen by the upward growth of the decidua reflexa. We were puzzled how the ovum came to lay outside of the lumen of the tube. In many instances we attempted to explain it by assuming that there had been diverticula from the lumen, which extended a varying distance out into its wall, and believed that the fertilized ovum had entered one of them, had been arrested at its distal end and there undergone further development. Undoubtedly, this sometimes occurs, but even in such cases the egg at the time of implantation burrows down into the tissue just as in normal uterine pregnancy.

When we come to study the serotina basalis, we find, as Dr. Litzenberg has described, the great mass of the tissue made up of the fetal cells with very few of the decidual cells scattered among them. In unruptured tubal pregnancy, the egg is always separated from the lumen of the tube by a capsule, the so-called pseudo-capsularis, in which we get even fewer decidual cells than in the basalis. As the trophoblast proliferates about the ovum it causes the same destruction as in the basalis, and as the capsule is as a rule thinner than the walls of the tube, rupture is more likely to occur through the former than through the latter and we then have a satisfactory explanation for the more common occurrence of tubal abortion than of tubal rupture.

Indeed, I think that one of the very interesting things in connection with the history of extrauterine pregnancy is the very remarkable change which has taken place in our views concerning the relative frequency of rupture and abortion. Twenty years ago the former was considered the almost universal outcome and the latter as a pathological curiosity. But now we have come to believe that abortion occurs much more commonly than rupture, particularly when the ovum is implanted anywhere except in the isthmic portion of the tube.

Concerning the hemorrhage to which Dr. Litzenberg referred, we get very much the same conditions in tubal as in uterine pregnancy and the changes which he demonstrated in many of his specimens are identical with those which occur in many cases of uterine abortion before the egg has become entirely separated from its attachment. Consequently, I think that the occurrence of hemorrhage either within the capsule, that is, around the periphery of the egg or outside of it, are conditions which are common to both uterine and extrauterine pregnancy.

DR. ROBERT T. FRANK, NEW YORK CITY.—I will really confess that I was not able to follow Dr. Litzenberg in his demonstration. His sections were longitudinal. I have been in the habit of cutting these sections transversely. I see no particular advantage, after having looked at his sections, in the longitudinal method of cutting, because there are only a few of them that are useful and these are the ones which give us a good general survey.

As to the comparison of tubal with intrauterine pregnancy, I think there are absolutely no differences except such as can be accounted for by purely mechanical factors. Decidua in the tube lacks in thickness and varies in gross composition from that in the uterus. The tubal musculature and connective tissue do not respond by rapid and per-

manent hyperplasia and hypertrophy to the stimulus of pregnancy as the uterus does. The uterus does this even in tubal pregnancy, rapidly enlarging and forming a perfect decidua.

The erosive action of the ovum destroys the decidua in the neighborhood of the ovum and we see it to greater advantage outside of the ovular body.

Tubal abortion is a misnomer because it is not an abortion, but an outgrowth into the lumen of the tube. This is purely mechanical.

As to physiologic conditions, I recall a statement made many years ago by a member of this Society (Dr. Webster) that nidation can only take place in Müllerian tissue. The truth of this statement has become more definitely proved in the last year or so, particularly under the influence of work done by Dr. Cullen, another member of this Society, who has pointed out that uterine glandular structures can be found scattered in places in the ovary, on the surface of the uterus, in the umbilicus and in the round ligament.

As far as the hemorrhage of tubal pregnancy is concerned, I think the sole differences between extra- and intrauterine nidation can be explained upon purely mechanical grounds.

Dr. Smith has covered the ground so fully in his paper that all I can do is to bring to your attention several personal experiences. These cases can be divided into two types. In one type the intraperitoneal hemorrhage is of unknown origin. When I say this I lay myself open to criticism, but I can say to you that in three cases I have been unable to find the cause of the hemorrhage. In two of them I removed the uterus. One was a fibroid with peritoneal tuberculosis. I found a small tear in a vein over the fibroid. Examination showed a fresh tear and whether it was made in the hurry of exposure of operation I cannot tell. The patient recovered.

The second case was one in which I found an enormous quantity of blood in the abdominal cavity. The patient died three days later. At autopsy I injected colored fluid into the vascular system and was unable to find an exit for the bleeding.

Another case was one in which I had made a diagnosis of two months' pregnancy with twisted pedicle of an ovarian cyst. I was called several hours later by the doctor who said the patient had a ruptured ectopic pregnancy. I found a two months' pregnant uterus and twisted ovarian cyst with the pedicle torn completely off during transport, the bleeding coming from the torn ovarian artery.

The last case was one in which a pelvic mass was discovered. I aspirated and obtained pure blood. I at once opened the abdomen and encountered a terrific hemorrhage, which was practically uncontrollable except by compression of the aorta. The woman died. At autopsy the condition found was an ectopic chorioepithelioma; the pelvic tissues, including the sacro-uterine ligament, having been eroded. An aneurysmal mass formed by all the vessels in the neighborhood embedded in placenta-like tissue formed the source of the hemorrhage.

DR. BENJAMIN P. WATSON, TORONTO, CANADA.—I do not think it is advisable to carry the nomenclature of intrauterine pregnancy into that of extrauterine pregnancy, especially with regard to the terms *basalis* and *capsularis*. As Dr. Williams pointed out, the ovum implants itself in the tube by burrowing into the wall. In early tubal pregnancy, such as we saw in the demonstration of Dr. Litzenberg, there is no possibility of saying, which is *basalis* and which is *capsularis*. These are young ova, the oldest about six weeks.

With regard to the distinction between rupture and abortion, to my mind they are essentially the same thing. One cannot have tubal abortion without a previous tubal rupture. In cases of so-called rupture, it takes place in the peritoneal aspect, but the ovum cannot get into the tube until it ruptures into the lumen of the tube from its position in the tube wall. There has been too great a distinction made between rupture and so-called tubal abortion. They are essentially the same thing. In both cases the ovum ruptures through the tube wall, through the peritoneal aspect, or through the mucous membrane into the lumen.

DR. DICKINSON.—Clinically there is a difference.



DR. WATSON.—Yes, clinically, there is a difference. When rupture occurs in the lumen, the hemorrhage is small and the symptoms less acute; but so far as the pathology goes, they are essentially the same.

DR. JAMES E. KING, BUFFALO, NEW YORK.—I desire to report a case of abdominal hemorrhage from a large fibroid, which belongs in the group of cases described by Dr. Smith. The patient was a spinster, thirty-eight years of age, who had a fibroid the size of an adult head, and a femoral hernia of the left side. In the early morning hours she was seized with severe pain in the abdomen associated with vomiting. She noticed the femoral hernia had descended and was giving her pain. The family physician who was called regarded it as an intestinal attack without attaching any importance to the fact that her hernia was out. I was asked to see her in the afternoon. At this time the hernia seemed to be a factor in her case, as I found on trying to replace the hernia it did not go back. I was also struck with the peculiar doughy feel which the mass presented. We took her to the hospital and operated and in opening the hernial sac found it contained a clot with some free blood around it. The abdomen was opened through a transverse incision and a fibroid the size of an adult head was found. On the fundus and anterior surface was a clot of blood, to which was loosely adherent a portion of the omentum. Upon releasing the omentum a very considerable hemorrhage took place from a ruptured vein. The abdomen was filled with blood as one would find in early rupture or tubal abortion. The tumor was removed and upon examination I found no particular reason for the ruptured vein except that in a part of the tumor there was considerable edema and cystic change which I presume caused rapid growth and stretched the vein which lay across the surface of the tumor.

DR. LITZENBERG (closing the discussion on his part).—Dr. Williams will have to take my word for the accuracy of the demonstration because I only showed one slide, but the demonstration was the result of studying 200 consecutive slides to prove the point.

As to the hemorrhage in extrauterine pregnancy and the hemorrhage in the uterus, I tried to make clear that in so far as implantation was concerned, the implantation in the tube and uterus is identical. The differences are anatomical and histological. In the tube there is very little stroma, very little decidua, there is very little tube wall, therefore perforation is easy.

Dr. Frank says there is no advantage of longitudinal sections over the transverse or cross sections. My reasons for longitudinal sections is that in making them I had only 600 slides of each tube, whereas in the cross sections I would have 2000, and believed that I could study the 600 sections more readily than 2000, if I wanted to study the whole tube.

DR. SMITH (closing the discussion).—I have no doubt many of you have seen instances in which these hemorrhages have occurred, but the cases have not been reported. In cases where hemorrhage has occurred intraperitoneally, from fibroid tumors, oftentimes it has been difficult to find the source of the hemorrhage for reasons which are apparent. The tumors are large, the number of blood vessels is large, and oftentimes they are not bleeding at the time the patient is operated, and it is impossible to tell exactly where the hemorrhage came from. The point to be borne in mind is the possibility of this accident in cases of fibroid tumors.

### Symposium on Sterility

DR. CHARLES G. CHILD, JR., of New York, read a paper on **Sterility in the Female with a Report of Operative Cures.** (For original article see page 248.)

DR. ROBERT L. DICKINSON, of New York, presented a paper entitled **Artificial Impregnation: Essays in Tubal Insemination.** (For original article see page 255.)

#### DISCUSSION

DR. EDWARD REYNOLDS, BOSTON.—I think Dr. Child is to be congratulated on his showing of operative work in tubal sterility. Seven successes is a large number for any one operation. He did not tell us what the total number of operations was. We may assume that it came from a large series, because it is the universal experience that the percentage of successes in opening closed tubes is small. To have gotten as many he must have done creditable work.

My own experience is that tubal cases are very unsatisfactory for operation and few successes are obtained. On the other hand, my experience is that cases in which the trouble is in the ovaries are extremely favorable. I am having records of my cases looked over and I hope in the near future to be able to present the end results of my series. I am able to present a good percentage of successes after conservative operation on the ovaries wherever the tubes were in good condition. Where one tube presents a mild salpingitis, a closed tube without much change, while the other remains normal, the woman is invariably sterile. Examination of the secretions will show that there is drainage from the affected tube into the uterus and this destroys the spermatozoa. In practice, if you find on operation that one tube is normal and the other tube closed, complete removal of the injured tube, the closed tube, with exsection of its interstitial portions from the cornu, will almost invariably, in a very large percentage of cases result in immediate fertility if the husband is potent and healthy. Those are the only favorable tubal cases of which I know.

Artificial impregnation is a subject of interest but one of which I am rather skeptical. Dr. Dickinson has reported the cases of three women, with success in two of them. That is a higher percentage than is usually obtained and perhaps due to his method of injecting the tubes.

I would take issue with the statement that these results can be obtained better than by operative work. It is not a high percentage as compared with the other work. I do not believe it is free from risk. I have seen in the course of my experience a considerable number of women who had artificial impregnation attempted and a pretty large proportion of them had tubal trouble. I do not believe that artificial impregnation is altogether harmless.

Washing semen through the tubes impresses me as unphysiologic. I should want to see a large number of successes before I was ready to use it. In Nature semen never reaches the tubes. In natural impregnation postcoital examination shows that the non-living seminal elements do not even enter the uterine body. The cervix is full of them. The spermatozoa and the spermatozoa only go higher by unaided motility. The use of artificial insemination promiscuously without careful isolation of these cases which are due largely to cervical obstacles, I believe to be thoroughly unscientific and not free from danger. It comes down, in short, to the general principle that the routine adoption of any procedure for a condition which is the result of multiple and varying causes is poor practice. When cases have been isolated as appropriate for artificial impregnation, that is another question.

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—I think the keynote was struck by Dr. Reynolds as he sat down and that is, individualization of the cases of sterility. It is remarkable in the study of these cases to see how many of the male elements are inefficient. In a study we made and presented to this society of 687 cases, there were 301

of these women who were free from inflammatory histories that could be considered as possibly becoming pregnant; that is, free from a definite gonorrheal or postabortal history. Out of this number of men to whom these women were married, it was found that 90 of the men could not impregnate the women because they were sterile.

An interesting point brought out by one of the speakers, Dr. Dickinson, I think, was that they seemed sterile today and nonsterile tomorrow. I have had a number of these cases where reports have come in of men who were sterile and yet with little treatment the women become pregnant. These men may have lived with their wives for two or three years without any pregnancy having taken place. We would send them back and we would find them sterile again and after treatment they were able to produce another offspring.

Personally, our experience has been that the largest proportion of our cases of sterility are due to endocervicitis and some change in the secretion at the cervix. Here again, it is remarkable how the cervical secretion will change in the same woman. Women will go for periods of eight or ten years sterile, yet with the simple application to the cervix of such remedies as iodine and glycerine, they promptly become pregnant after treatment. There is no question in our minds that endocervicitis is a great factor.

I congratulate Dr. Child on his report. I have done 100 salpingostomies and only one woman has had three children from a resected tube. I have had seven ectopics as a result of my salpingostomies, which is interesting, and probably due to a defective procedure.

In regard to Dr. Dickinson's proposition, I feel very much as Dr. Reynolds does. I should like to know the cause of the sterility and would like to be reasonably sure before injecting semen into the uterus. I have tried it several times and I have obtained a reaction because I made such a bad selection of cases.

DR. ISADOR C. RUBIN, NEW YORK CITY (by invitation).—It would be well to know the total number of cases Dr. Child operated on for tubal occlusion and especially those in which he had no success.

The value of a test other than surgical to determine whether tubes are occluded or not can be illustrated in two cases in my experience. One occurred in my practice a number of years ago. A woman had been married three years and was sterile. I found a slight thickening on either side of the uterus. I went over the possibilities with this patient, tried all tests, found her husband absolutely potent, and decided I would give her the benefit of a tracheloplastic operation. She remained sterile. A year and a half later I heard indirectly from a colleague that she had been "butchered" by the operation; that is, that was the conclusion she came to following the consultation with a certain gynecologist, and she visited many others for relief of her sterility. She was then told that the cause of her sterility was the torn cervix; also that she had definitely diseased tubes and ovaries due to infection resulting from my operation. It was very disagreeable naturally to hear these things about an innocent operation. If it had only been possible for me to have her consent to a laparotomy at the same time that I did the Pozzi operation or could have employed some method whereby I could determine whether the tubes were patent or not, I would be in a better position to defend myself.

The second case I had three weeks ago in the ward at Mt. Sinai Hospital that well illustrates the value of such a diagnostic method. The patient had been married three years and was sterile. She had been examined by the staff and a slight thickening on one side was made out. Four days before my examination of this patient she had had a curettage and stem pessary insertion calculated to relieve her sterility. I removed the stem pessary and introduced oxygen into the uterus and found the tubes absolutely closed. We did a laparotomy the same day and found bilateral hydrosalpinx. Both tubes were slightly adherent but not very much distended, the walls being flaccid, accounting for the practically negative physical examination. This case was typical of numerous cases in which the same or similar procedures are done to cure sterility and yet the cause of the difficulty is not in the cervical canal but rather higher up in the tubes. The method of intrauterine inflation with oxygen to determine patency or occlusion of the Fallopian



tubes by establishing a pneumoperitoneum or failing to establish a pneumoperitoneum, affords the indication for the type operation that should be done. So far I have tried this method in 100 cases, that is from November 3, 1919, to date, and have found it absolutely safe, well tolerated by the patient, and reliable for the data for which the method was intended.

With reference to Dr. Dickinson's paper, there is no doubt that his results are most encouraging. I was especially interested in his observation that the uterus does not tolerate fluids like collargol, thorium and silver. I found this to be the case in my early experiments. Oxygen, however, is very well tolerated up to a certain point. These women complain of slight pain from the intrauterine pressure and distention varying with the individual. The pressure ranges between 50 and 70 mm. in the average patent case. When the tubes are occluded the pressure rises to 210, 220 or more. I do not recommend carrying the pressure beyond 200. Cases in which we had an opportunity to control later by laparotomy, the tubes were found closed where the pressure was 200.

DR. GEORGE GELLHORN, ST. LOUIS, MISSOURI.—Nine years ago I presented a paper on salpingostomy and at that time I reported the case of a woman who had conceived. She has had a second child since. Two other cases terminated with miscarriages. This, of course, had nothing to do with the operation. I have done in all about 40 salpingostomies, never solely for the purpose of opening tubes, but only when I found the tubes occluded in the course of a laparotomy. The number of operations was further cut down by the fact that I excluded all cases of inflammatory origin. The condition of the tube, more particularly the thickening of the walls, was the primary indication. In short, I limited the operation to cases where the occluding factor apparently came from without the tube rather than from within. This leaves practically only those cases of tubal occlusion for operation which have been caused by a previous appendicitis or ectopic pregnancy. If performed with such limitations, salpingostomy carries with it no dangers of any kind.

DR. N. SPROAT HEANEY, CHICAGO.—I would like to ask whether any particular time was observed in relation to the menstrual periods in these cases that were injected?

I have been considerably interested in the question of sterility because of the fact that in addition to being a gynecologist and obstetrician, I am a dairy farmer. Sterility in the dairy world is an important topic and is of the greatest economic importance at the present time.

Last fall we awakened to the fact that about one-half of our dairy herd was sterile. We called in a veterinarian and had the whole herd examined in order to separate the pregnant from the nonpregnant animals. The records of the nonpregnant animals were looked up and we found out when they had last conceived. In working with live stock we do not have the difficulty which Dr. Gellhorn mentioned and which makes the question of sterility in gynecology hard to become interested in. It takes such a large number of cases in order to reach any logical conclusion. In the dairy world we can follow each case to a logical conclusion. Examination of the bull showed that he had perfect semen. We found ten cows sterile. When a cow does not conceive after two services, something is the matter with her. Ordinarily such cows are sent to the butcher, but in a pure bred herd such a procedure represents a big sacrifice. One of these cows had an infantile uterus and after killing her, autopsy supported the clinical diagnosis. A second cow, a very valuable animal which had recently miscarried due to specific abortion, which miscarriage was followed by septicemia, showed upon examination a large swelling of the left tube and ovary. Examination produced a recurrence of fever and the cow became very sick. After killing this cow, we found she had an extensive tuboovarian abscess. All the remaining cows showed normal genitalia, except for extensive cervical erosions and high grade endocervicitis. These cases were all treated with applications of iodine to the cervical canal for periods of two to three months until satisfactory local conditions were obtained, before rebreeding. Six of these cows are either now pregnant or have been delivered. Two of these cows resisted treatment so that recently I operated upon

them. In each I did a dilatation of the cervix and an amputation, following the technic very closely that I use in the human subject. These cows have patent cervixes and I feel confident that the operation will be successful.

DR. LEWIS S. McMURTRY, LOUISVILLE, KENTUCKY.—The very basis of a satisfactory consideration of this subject is presented in the remark of Dr. Reynolds in the discussion, namely that the causes of sterility are so multiple and varied that there cannot be any scientific elucidation of the subject until we know more accurately the causes of sterility in both male and female. Let us examine some of the contraindications that we encounter. In the first place, it is common observation, more common years ago than at present, that in multiple lacerations of the neck of the uterus the operation of trachelorrhaphy, restoring the cervical canal, closing it, as it were, is very frequently followed by pregnancy when years have elapsed without conception. On the other hand, the most abused operation perhaps in gynecology, especially in the hands of the general practitioner, consists in forcible dilatation of the cervix uteri in an effort to cure sterility. Young women get married, go for two or three years without conceiving, go to a physician, and at once he proceeds to dilate the uterus and perhaps do a curettement at the same time, thinking she will as a result, conceive. That is a contradiction. We close the uterus in one case, and in another open it.

There is something about the internal secretions that has a great deal to do with sterility, although our knowledge of it is incomplete at the present time. Let me mention this one observation. In the mountains of Virginia, Kentucky and Tennessee, where people lead the simplest lives, and where they have the poorest obstetric attendance, where gynecologists are unknown, the families are large, six to twelve children in a family. Undoubtedly the frequency of infection is lessened by their isolation and simple mode of life.

DR. CHILD (closing the discussion on his part).—In answer to Dr. Boldt's question as to what I mean by resection of the ovaries, I will say that I had reference to those cases in which the ovaries are enlarged, studded with multiple cysts and the cortex thickened, so that the Graafian follicle could not rupture and discharge its ovum, as denoted by the absence of any scar of a previous rupture. In both of these cases one ovary was decapsulated, that is, the capsule was stripped off to get rid of the thickened covering, and in one case the other ovary was resected as well.

DR. DICKINSON (closing the discussion).—A method that works on the cow might work on the human individual that also has nine months' gestation. I wish a veterinarian had told us of the insemination of cattle because I understand that is a regular performance nowadays.

I can add two further cases to those spoken of, two of Dr. Carey's. Every additional case means that the procedure is worthy of a trial.

I should like to emphasize again the fact that semen may not enter the uterus true to form, and that we have to study the semen repeatedly.

Dr. Gellhorn raises the objection that you cannot examine the husband. You do not have to examine the husband. You can give the woman one of the rubber bulbs that are used for injecting various fluids into the urethra of the male. She takes that to bed with her, puts it under her pillow, and immediately after coitus she slips it into her vagina and thus has a specimen to bring to your office. By means of a test tube inserted into the introitus, a specimen may also be collected in a satisfactory manner.

Lastly, I wish to repeat that unless we begin to report these isolated cases we will never have any reliable data from which to draw conclusions.

DR. WILLIAM A. COVENTRY, Duluth, Minn. (by invitation) read a paper entitled **Lutein Cysts Accompanying Hydatiform Mole**. (For original article see page 266.)

DR. GEORGE GELLHORN, of St. Louis, Mo., read a paper, illustrated by lantern demonstration, entitled **A Method of Covering Raw Surfaces Upon the Uterus**. (For original article see page 262.)

DR. GEORGE GRAY WARD, JR., New York, N. Y., presented a lantern demonstration and case report entitled **The Operative Technic Employed in the Closure of an Extensive Vesico-Urethro-Vaginal Fistula**.

Dr. Ward in reporting this case referred to the unusual difficulties encountered owing to the loss of tissue from numerous previous futile attempts at repair and also directed attention to the fact that in such cases no set method of procedure can be depended upon to accomplish a result on account of the varying conditions met with in the individual case.

The patient, Mrs. M. S., aged twenty-nine, came under Dr. Ward's care at the Woman's Hospital, New York, in May, 1919, complaining of complete inability to hold the urine, following an instrumental delivery four years previously. She had been married eleven years and ten years ago when seven months pregnant, the instrumental labor resulted in a stillbirth. The laceration sustained at that time was repaired and the patient was in bed for a month. She then had seven spontaneous miscarriages during the following six years, with a curettage after each one. On December 8, 1915, when six and one-half months pregnant with twins, she went into labor; the membranes ruptured spontaneously, but an instrumental delivery was performed. Seven days later a continuous discharge of urine was noted. Two months after delivery an attempt was made to close the bladder fistula without result and in the next four years thirteen unsuccessful attempts were made by three different surgeons to bring about a closure. One of these operations was followed by an abdominal hysterectomy. Examination on admission to the hospital showed an edema of the external genitals and vagina, excoriations and numerous phosphatic deposits deeply embedded in the tissues. It was obviously impossible to attempt any operative procedure until the local conditions were improved. Rest in bed, daily hot douches, boroglyceride packs, zinc oxide ointment externally were employed and the internal administration of a prescription containing benzoic acid and sodium borate, which the late Dr. Thomas Addis Emmet had successfully used to render the urine acid and prevent the formation of phosphatic deposits. This course of preparatory treatment extended over a period of six weeks and the final attempt made to close the fistula on July 7, 1919. The technic was as follows:

The patient was placed face downward in Bozeman's position, the hips being well elevated. A large vaginal retractor was inserted and the perineum retracted upward. The ureters were then probed to establish their location, so as to avoid injury. A strip of tissue from  $\frac{1}{2}$  to  $\frac{3}{4}$  inches wide was denuded with scissors completely around the edges of the cavity, extending across the site of the stump of the cervix which had been amputated, and also extending on the inner surface of the quadrangular flap at the site of the urethra. The cervical stump was next grasped with a bullet forceps and traction towards the urethra permitted ready approximation of the tissues lateral to the cervical stump. This threw the margins of the fistula into angles in the lateral fornices, so that the fistulous opening which was originally like the letter "O" now became shaped like the letter "U." The vesical edges of each angle were then closed by interrupted sutures of No. 1 tanned catgut. A second layer of interrupted sutures of silkworm gut was passed through the vaginal mucosa and the denudation of both sides, and the ends left long and tied together. The quadrangular flap at the side of the urethra was placed over the denuded stump of the cervix and sutured in a similar manner.

The result of this technic was a complete closure of the defect without tension.

A self-retaining catheter was inserted into the bladder through the urethral meatus and the bladder washed out with boric acid solution. The catheter was kept clean by daily irrigations with boric acid solution, was changed every four or five days, and retained for twelve days, at which time the sutures were also removed. The wound healed by primary union.



The result was most satisfactory for, although the patient has no vesical sphincter, she is able to retain her urine without leakage for a period of from two to four hours in the erect posture, and at night she can at times go considerably more than four hours.

#### DISCUSSION OF PAPERS OF DRS. GELLHORN AND WARD

DR. CHANNING W. BARRETT, CHICAGO.—In closing the extensive vesico-vaginal fistula reported, Dr. Ward has shown much ingenuity in this particular procedure. Previously he has laid quite a good deal of stress upon the advisability of getting away from the mere border of the fistula and treating it as a cystocele, starting in healthy tissue first. As there was no healthy tissue here to follow he has been thrown back upon this procedure described. In an extensive injury such as this patient had, inasmuch as there was no urethra, no sphincter vesicæ, I might have chosen the procedure of closing up the vaginal outlet and directing the urine into the rectum, as Dr. Peterson has shown may be done. He presented experimental work with fairly good results as regards sphincteric control, nonirritability of the rectum, absence of infection of the bladder and ureters from the rectum. However, if this result can be brought about with a patient able to go six or eight hours without urinating, I should say this method would have the advantage. We would hardly expect patients without sphincteric control to be able to go that length of time even in bed, and much less so when they are up and about. It is not always easy to get good union of the tissues throughout the whole area in extensive cases of this kind. No matter how much we admire the great brilliancy and patience of Dr. Marion Sims and honor him for the original work he did, we would hardly use his method extensively now. Success in dealing with fistula depends on the fact that instead of one membrane to deal with as a whole, we have two distinct membranes to be dealt with separately, namely, the bladder wall and the vaginal wall.

By mobilizing the bladder when it is possible, any sort of opening can be approximated; but it results only in diminution in the size of the bladder which is left. However, if we can get union the bladder will eventually distend.

Another great virtue is, instead of dealing with a closure like we have in the rectum, we can keep the bladder empty during the time of healing so that any strain upon the sutures can be taken off, but in spite of keeping it empty with a retention catheter, in a fairly weak place, a place that has been difficult to close, there may be a little leakage of urine that is apt to cause breaking down of the stitches at that point. I would lay stress in extensive cases, where such a weak place has been encountered, upon the advisability of making a temporary fistula anteriorly, opening the bladder and getting drainage anteriorly while healing is taking place. There is no difficulty in getting closure of an anterior opening, and by keeping the patient in Sim's position on the side opposite to the weak place, as the fistula is seldom in the median line, the suture can be kept almost absolutely clean from urine while healing takes place, and that facilitates closure in some cases.

Another point in regard to the closure. If we leave the vagina the natural length, and if the cervix opens separately from the bladder, it is usually not difficult to separate the bladder from the uterus instead of pulling the uterus down. You get the same amount of bladder tissue by leaving the uterus behind and pulling the bladder down, and by leaving the uterus behind you have a much better position of the uterus. A patient rather than have a vesicovaginal fistula would be willing to put up with a little disability of displacement, but we don't want the uterus down at the outlet if we can help it. That can be prevented by separating the bladder from the uterus and then almost any sort of opening can be closed. Some cases of vesicovaginal fistula are easy to close, while in others by reason of scar tissue we have great difficulty in getting at them.

The method described by Dr. Gellhorn for covering the uterus is ingenious. A great help in doing abdominal surgery is that there is no great tendency to adhesions unless there is some reason for adhesions to form. In reoperating cases we usually find that if the omentum has become greatly adherent to the uterus, or the bowel has become greatly adherent, it is because there has been reinfection in the stump by reason of not having taken out the angles of the uterus, but if it is necessary to cover any portion of the uterus, by this procedure it can be done. A suggestion comes to me that if there is any irritation of the bladder

at all, we can go a little higher and get the peritoneum a little farther from the abdominal wall.

DR. REUBEN PETERSON, ANN ARBOR, MICHIGAN.—At the suggestion of Dr. Gellhorn I have tried this procedure in a number of cases and am rather pleased with it. It has a limited field where it is desirable to cover the uterus. I would not be at all afraid of pregnancy supervening after this operation.

With regard to Dr. Ward's case, I cannot agree with Dr. Barrett as regards the advantages of utilizing the rectal sphincter as compared with the results obtained by Dr. Ward. I have done this operation in a number of instances and have worked up the literature. While the patient is able to hold her urine and is comfortable as compared with being wet all the time, she does not enjoy her condition. These women bitterly complain for obvious reasons. The operation should be reserved for those cases where the patients can be made comfortably by no other means.

Dr. Ward's technic is very interesting. It shows what can be done with these enormous fistulæ by dissecting away the bladder from the vaginal surface. However, I do not see why if the bladder sphincter has not been restored the patient does not continue to have a dribbling of the urine.

DR. WARD.—When she is on her feet the bladder is on a level and runs over, and at night when she is lying down she can go four hours without urinating.

DR. PETERSON (resuming).—I desire to add one thing to what I have already said. Dr. Barrett spoke of opening the bladder so as to get drainage and enabling these urethral fistulæ to heal. There is a better procedure than that if we utilize what the urologists are doing after prostatectomy. They drain the bladder from above by a system of vacuum bottles so that practically no urine escapes by the perineal route. If we will adopt the same method in the closure of vesico-vaginal fistulæ and urethral fistulæ, then these fistulæ will heal without any urine escaping from the urethral opening. I have cured one case of urethral fistula which many operations had failed to close, by the use of this technic. This to my mind is a valuable addition to the technic of the closure of urethral fistulæ, because infection always occurs where one has to drain the urethra or the bladder by means of the catheter.

DR. JAMES E. KING, BUFFALO, NEW YORK.—As Dr. Ward has said, these accidents are very much rarer than they used to be and I think I have had probably the average experience with the ordinary vesicovaginal fistulæ. It was not, however, until three weeks ago I encountered a case in which a family doctor (the patient living out of town about fifty miles) had applied forceps to this case and in using traction was greatly surprised to see the head suddenly emerge, with a fluid which he took to be some amniotic fluid. Upon examination after the delivery he discovered he had pulled from the base of the bladder the entire urethra. Upon the patient entering the hospital four months later, I found she had an opening at the point where the base of the bladder had been, which admitted a finger, the urethra being split entirely open. The problem which presented itself in this case was the question of getting the vesical sphincter together. In repairing it I found no indication of the sphincter of the bladder, but I attempted to bring the tissues together in such a way that if such a sphincter was there, I might approximate the ends. The urethra was then built up as well as possible. I then put in a drain through the vagina and sewed in the tube. I was surprised upon removing the drain through the artificial opening which I had made, to find my patient was able to retain her urine, and even now, if she is on her feet, she can go four or five hours without urinating. We have not decided to extend the capacity for holding urine, but she has already been reported as having passed 300 c.c. at one time.

An interesting point, as illustrated by Dr. Ward's case and the one I have recited, is this: Neither he nor I obtained a sphincter on which we could rely to control the bladder containing urine, but so far as my own experience goes and that of Dr. Ward, the sphincter of the bladder is not of such great importance in retaining urine as is the sphincter of the rectum in controlling the rectal contents.

DR. C. JEFF MILLER, NEW ORLEANS, LA.—There are a few salient points, regarding the technic of closing vesicovaginal fistulæ, that are fundamental, and must be kept in mind,

whether the fistula is a small, uncomplicated injury, or a large opening involving the urethral area, or urethra.

The first, and most important, is the necessity of dealing with the bladder as an independent organ. The cause of the majority of failures rests in the scar tissue of the vaginal wall, which presents so much tension, that the sutures slough. The anterior vaginal plate stretches between fixed points of the pelvis, and permits of only a minor degree of adjustment; therefore the vaginal plate must be freely incised, the release of the bladder wall accomplished by dissecting from the normal area into the scar tissue, and freed sufficiently in every direction to allow the bladder opening to be inverted and sutured without tension.

Failure to appreciate the necessity of this wide separation, especially when the opening is held close to the bony structures, spells disaster in many cases. In four very extensive fistulae, I have performed a combined vaginal and abdominal operation. Separation was first carried out as far as possible through the vagina, then completed through an abdominal incision, the opening being closed *per vaginam*. Two of these cases were openings closely attached behind the symphysis, and presenting extensive infiltration. In another case, where practically the entire bladder base was destroyed, it was comparatively simple to close it by the combined vaginoabdominal method, and the result was especially satisfactory. The bladder capacity was reduced to two ounces for a few weeks, but eventually accommodated itself to hold eight ounces.

Another point that I wish to emphasize is the importance of careful dissection and preservation of structures when dealing with fistulae involving the urethra. In two bad cases of this type, recently operated upon, in which I despaired of sphincteric control, the function was perfect. We cannot identify the sphincter fibers in any dissection, but by carefully approximating the urethral structures, we are frequently most agreeably surprised at the perfect results. Closing large fistulae, by using the uterus as a plug, must be resorted to occasionally, but subsequent complications are frequent, and the procedure should be reserved only for exceptional cases.

DR. J. WESLEY BOVEÉ, WASHINGTON, D. C.—As regards the ingenious operation devised by Dr. Gellhorn, I agree with Dr. Peterson that it has a small sphere of usefulness. In the large proportion of cases of Neisserian infection of the uterus and appendages, requiring the removal of the Fallopian tubes, we usually decide to remove most of the uterine mucosa, which will include most of the uterine body, and in the presence of infection we would expect adhesions to the posterior wall. In such a case as that in which I find Neisserian infection outside the uterus I resort to vaginal drainage by paraffin-stearine gauze brought over the raw surfaces and left a sufficient length of time to allow endothelization to take place.

As to the fistula work, it is very important. Some of these cases of fistulae are very difficult and tedious to handle. I have seen cases in which I have never got around to do the operation of closing the opening between the vagina and bladder because of the condition of the urine and the condition of the bladder itself. I know one woman in whose case I tried for three periods of four months each to get rid of alkaline urine. When she first came in I removed a calculus that nearly plugged a large opening which she had in the septum. I built a urethra for her easily. There was no evidence apparent that she had ever had a urethra. I passed a bistoury from the pubic arch to the interior of the bladder, puncturing the bladder mucosa. I then made a vaginal flap and drew it forward from the bladder through the canal I made with the bistoury, sutured the end of it near the pubic arch and secured for her a urethra. I see her occasionally and bring her into the hospital, but I have not decided it is safe yet, on account of the condition of the bladder, to close the fistulous opening.

I am quite in accord with the idea Dr. Peterson has given us as to suprapubic drainage in these cases, particularly if we have surgical work to do on the sphincteric muscle of the bladder and on the urethra, not so much where these are intact, in operating on the fistula.

DR. WARD (closing the discussion).—In this particular case, in a woman 29 years of age and married, the procedure suggested by Dr. Barrett of colpoelcisis would have been out of the question. She never would have consented to it.



# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### Five Year Radium Cures of Cervical Cancer

(Critical Review of Recent Literature)

BY FRED. J. TAUSSIG, M.D., F.A.C.S., ST. LOUIS, MO.

Sufficient time has now elapsed to form a tentative estimate of the value of radium as a curative agent in cervical cancer. As far back as 1914 a few cases were reported by Cheron and Duval,<sup>1</sup> and Wickham and Degrais,<sup>2</sup> that had remained cured for four years, but no systematic treatment on a large scale was begun until the years 1913-1915. Those were the times when radium enthusiasm was at its height and we can now determine the final outcome of the cases treated during that period. That a large proportion of these reports emanate from Germany is to be explained chiefly on two grounds: The one is that German cities and universities purchased large quantities of radium and mesothorium for their clinics and hospitals in 1913; the other is that the German Gynecological Society at its meeting at Halle in 1913 decided to try out on a large scale the use of radium therapy in operable as well as inoperable cancer of the uterus and to report at the meeting two years later. The war came and not unfortunately interfered with premature reports of these results. A five year period has now elapsed and we can begin to form an estimate of the percentage of permanent cures obtained. Experience with the results of the radical hysterectomy of Wertheim already showed conclusively that it was necessary to wait five years before counting a case as cured. Even after that time an occasional recurrence would be found, but this was so exceptional that it did not materially influence the final percentages. The absolute cures by this radical hysterectomy averaged around 20 per cent, that is to say, one out of every five persons afflicted with cervical cancer could be saved by operation. It has been claimed by von Seuffert<sup>3</sup> that recurrences following radium treatment do not appear later than three years after complete retrogression of the tumor, but the reports of Schaefer,<sup>4</sup> Heyman<sup>5</sup> and others thoroughly disproved this. So we had better hold to the five-year period as the final test of treatment. It cannot be denied, however, that the percentage of late recurrences is distinctly less after radium treatment than after operation. In this review, therefore, I have excluded those cases that had not been under observation a sufficient length of time. I also deducted all cancers of the uterine body, the urethra, and the vagina, since they demand separate consideration.

France, where radium was first discovered and used for the treatment of cancer, has produced no systematic study of five-year results. Degrais,<sup>6</sup> who was associated with Wickham, did not, in his recent report, give detailed statistics. His experience dates back to 1908, but his article only contains general observations as to treatment. The supply of radium in France has

always been limited, and the interest has centered more in dermatology than in gynecology.

From England we have the yearly reports of the Radium Institute, but there is no analysis of five year results, neither has any group of gynecologists specially interested itself in this form of treatment until recently.

Spain has produced in Recasens<sup>7</sup> a radium enthusiast whose experience extends over a long period. One hundred twenty-six of his cases date back to 1914-15 and thirty-two of them (25.4 per cent) are at the present time free of recurrence. He was one of the first to include operable as well as inoperable cases in his treatments.

In Sweden the institute at Stockholm purchased radium in 1913 and Heyman<sup>5</sup> has published carefully analyzed reports in 1917 and again in 1920 of the results of treatment in cervical cancer. Hansen<sup>8</sup> also has written concerning the work of this institute. Of the cases dating back to 1914-15, 66 patients showed 18 cures of more than five years' duration. This high percentage of 27.3 per cent curability may be accounted for in part by a better technic, for Heyman emphasized the importance of a high intracervical application, heavy dosage, and a series of three treatments, all within five weeks' time. Most other clinics at that time gave more frequent lighter treatments at longer intervals and made vaginal applications. This points to the possibility of a considerable increase in the percentage of cures under improved radium technic in other clinics.

From Switzerland we have a report, though a somewhat meager one, from Hussy,<sup>9</sup> of Basel, who found 3 cures out of 12 cases of cervical cancer treated longer than four years ago.

Germany furnishes the bulk of the evidence upon this subject and most of the reports appear in the transactions of the meeting of the German Gynecological Society held in Berlin, May 26-29, 1920. They include Schaefer<sup>4</sup> (Berlin) 282 cases; von Seuffert<sup>3</sup> (Munich) 205 cases; Warnekros<sup>10</sup> (Berlin) 173 cases; Flatau<sup>11</sup> (Dresden) 25 cases; Schweitzer<sup>12</sup> (Leipzig) 49 cases; Weinbrenner<sup>13</sup> (Magdeburg) 51 cases; Gieseke<sup>14</sup> (Kiel) 39 cases; Baisch<sup>15</sup> (Stuttgart) 42 cases; and Dietrich<sup>16</sup> (Goettingen) 26 cases. From some clinics such as Eckelt<sup>17</sup> (Frankfurt), Eijnar<sup>18</sup> (Heidelberg), and Adler<sup>19</sup> (Vienna) the reports available are too vague to be included in this summary. The accompanying table (Table I) gives the essentials of these reports. The percentages of permanent cures it will be seen range from 10 to 20 per cent.

American literature thus far contributes but little to this subject. Kelly<sup>20</sup> as far back as 1916 reported two cures, one of seven and one of five years' duration, but unfortunately he has not yet tabulated his five-year results, although he had treated 327 cases of uterine and vaginal cancer previous to April, 1916. Bailey<sup>21</sup> from the General Memorial Hospital of New York presented in 1919 a review of 49 cases of cervical cancer treated in 1915 with but 4 persons free of recurrence. Only one operable case was included in this list and his technic during that period was far inferior to that now employed, which accounts for his low percentage of curability (8 per cent). The greatest enthusiast for radium treatment of cervical cancer is Ransahoff,<sup>22</sup> who reports 3 cures out of 30 cases treated five years ago. Three additional cases of this series are free of recurrence two to four years after treatment. Schmitz<sup>23</sup> reports 3 cases of cervical cancer treated with radium alone, cured for longer than 3 years, but he does not state what proportion of his 208 cases were treated during these first three years, hence no percentage can be figured out. Clark<sup>24</sup> recently discussed the outcome of 209 cases treated between 1914-19. Practically all were inoperable. Out of 26 cervical cancers of over four years' duration, 3 were living and free of recurrence.

To obtain the absolute percentage of cures after radium treatment we must observe the same rigid rules that were laid down regarding the Wertheim

operation. All cases that present themselves for treatment, whether treatment is given or not, must be included. No deductions can be allowed for those that do not follow up treatment after one application has been made, for especially in comparing radium treatment with operation it cannot be denied that the latter has a distinct advantage in that all the work is done at one time, whereas radium treatment often extends over a considerable period during which the patient may for one reason or another fail to return, thus interfering with the final outcome. Neither can we deduct intercurrent deaths during the five-year period, even where death was proved by autopsy to be due to other causes, for no autopsy is so perfect that it can detect microscopic remnants of cancer in lymph gland or connective tissue. All complete or partial hysterectomies, whether done before or after radiation, must be separately considered, and, of course, we must limit discussion solely to primary cancer of the cervix. I do not think it advisable, however, for the present to distinguish between cases where radium alone was used and those where x-ray was given in addition. With such limitations I have been able to tabulate 1114 cases treated five or more years ago, of whom 223 are alive and free of recurrence. This means a curability of exactly 20 per cent, practically identical with the average results obtained by the radical hysterectomy.

We must bear in mind however when comparing the results of radium with those of operation, that the 20 to 25 per cent absolute curability by the radical operation comes after an experience of 15 to 20 years with this procedure during which time many improvements were devised to lower the primary mortality and decrease the likelihood of recurrence. The first results of Wertheim and others did not yield more than about 12 per cent absolute curability. A similar increase in cures is reasonably to be expected as a result of improved technic in radium treatment. In fact this has already been apparently obtained in two clinics which employed as early as 1914-15 methods of treatment similar to those now generally accepted as the best. It would seem therefore reasonably certain that in the future, if *all* cases of cervical cancer are included, radium alone will be found to cure more cases than operation alone.

The crux of the matter, however, as I see it, lies not in a comparison of *all* cases treated, but in a comparison of the *operable cases* alone. Not even the greatest skeptic can now deny that radium can effect a cure where operation is impossible. The percentages of cures in inoperable cancer of the cervix obtained in the larger clinics are: Schaefer 5.5 per cent, Warnekros 6 per cent, von Seuffert 8 per cent. Some variation will doubtless be found as to the limits of operability, but in general this has been fairly well established by past experiences. If these extreme limits, including the so-called borderline cases as well as the readily operable ones, be accepted, in other words those in which the expert surgeon would do a hysterectomy, we have a sound basis for comparative statistics. It seems strange that von Seuffert in his detailed and otherwise logical analysis, comparing radium with operation, included on the side of radium the nine radium cures obtained in his inoperable cases. We must hereafter emphasize that we are primarily concerned at the present time with the results obtained in *operable* cancer of the cervix. The vital question is whether in this group operation should be superseded by radium. Comparative statistics must allow no deductions. They must include merely the total five-year cures in all the operable cases, whether subjected to treatment or not, that come to the clinic during a given period.

As seen in the accompanying table eight writers gave sufficient details to permit the calculation of the percentage of operable cases of cervical cancer cured by radium alone. A total of 415 yielded 131 cures, or 31.5 per cent. This is considerably less than the 45 to 50 per cent cures obtained in the treat-



TABLE I

NAME	TOTAL CASES	5-YEAR CURES	PER CENT CURES	OPERABLE CASES	RADIUM CURES IN OPERABLE CASES
v.Seuffert (Munich)	205	40	19.5%	102	31
Schaefer (Berlin)	282	50	17.7%	155	43
Weinbrenner (Magdeburg)	51	18	35.3%	25	10
Warnekros (Berlin)	173	39	22.5%	96	34
Heyman (Stockholm)	66	18	27.3%	9	4
Baisch (Stuttgart)	42	7	16%	15	5
Schweitzer (Leipzig)	49	4	8%	8	2
Dietrich (Goettingen)	26	4	15%	5	2
Recasens (Madrid)	126	32	25.4%	—	—
Ransahoff (Cincinnati)	30	3	10%	—	—
Gieseke (Kiel)	39	4	10.3%	—	—
Flatau (Dresden)	25	4	16%	—	—
Totals	1114	223		415	131

ment of operable cases alone by the Wertheim hysterectomy. If we take von Seuffert's more detailed report<sup>3</sup> of the Doederlein clinic in Munich, we find that during the years 1908-1912, previous to taking up radium treatment, 167 operable cervical cancers presented themselves for treatment. Of these, 110 were early operable and 57 were advanced operable (borderline cases; 49 of the 110 early cases were cured by operation (44.5 per cent), whereas only 6 out of the 57 advanced ones were cured (10.5 per cent). Comparing this with the radium results, he found that out of 102 operable cases in the years 1913-1914 17 out of 40 early cases were cured (42.5 per cent) while 14 out of 62 advanced ones were cured (22.5 per cent). This would seem to show that in the early operable group radium is somewhat inferior to operation, whereas in the advanced operable, or borderline group, radium cures almost twice as many as operation. The figures of Schaefer from Bumm's clinic in Berlin correspond closely: 33.7 per cent radium cures out of 74 early operable cancers and 23.4 per cent radium cures out of 81 borderline cancers.

To summarize then, it has been established that:

1. Inoperable as well as operable cervical cancer can be cured by radium alone for more than five years in a not inconsiderable number of cases (223 out of 1114).

2. The percentage of cures by radium about equals that of cures by operation (20 per cent).

3. The results with radium in the operable cases alone are still inferior to operation, amounting to 31.5 per cent (131 out of 415) as compared with 45 to 50 per cent by operation. But closer analysis shows that while the percentage of operative cures is greater in the early operable group, the percentage of radium cures is greater in the borderline group.

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## Selected Abstracts

### The Value of Roentgenography in Obstetrics

**Warnekros: Pregnancy and Labor in Roentgen Pictures.** Zeitschrift für Geburtshilfe und Gynäkologie, 1918, lxxx, 719.

Advance in technic has made it possible to procure exact pictures of the fetus within the uterus by means of very short exposures of about eight to nine tenths of a second. By preparing series of pictures of the same patient in the course of pregnancy, and especially during the actual process of labor Warnekros was enabled to obtain "by direct observation" definite information concerning the normal attitude of the fetus during pregnancy, and what seems more important, concerning the mechanism of labor. Warnekros with some justification demands that wherever such observations do not harmonize with older views or theories, the latter now must be discarded as positively disproved. In regard to the normal attitude of the fetus he concludes: In the absence of a mechanical disproportion between fetus and uterus, and in the absence of any maternal or fetal abnormalities, the fetal head is held in a comfortable middle flexion. The fetal vertebral column in its convex bent is but conforming to the elliptoid shape of the uterus. There also is no forced or even typical attitude of the extremities. Their position depends solely upon the available space. This is true both for head and breech presentations. Any deviation from such a natural attitude suggests an anomaly of some sort. Even late in labor the fetus may change its position. The older conception that the presentation is dependent upon the stature of the mother is confirmed.

A thorough revision of views is required in regard to the mechanism of labor. Under normal conditions the head enters the pelvic canal without further increase in flexion. The extreme flexion occurs approximately at the time when internal rotation begins. This exaggeration of flexion clearly is the result of the pressure transmitted from the fundus by way of the vertebral column, which pushes the occiput deeper down. The vertebral column straightens while the head passes through the pelvis. Internal rotation apparently occurs, as is generally taught, under the influence of the pelvic floor muscles. At the moment when the head is born, in contradiction to common opinion, the shoulders are still seen to stand transversely in their normal relation to the head. There is no torsion. The thorax is circularly constricted and drawn down in a funnel shape. These findings possibly corroborate the older view that the first inspiration is effected by the spontaneous expansion of the compressed thorax.

(This article contains but a few of the many excellent radiograms which have been published in form of an atlas by J. F. Bergmann.)

**Warnekros: The Third Stage of Labor in Roentgenograms.** *Archiv für Gynäkologie*, 1918, cix, 266.

To obtain accurate pictures of the placenta within the uterus it is necessary to inject immediately after the birth of the child, into the umbilical vein a sterilizable, opaque fluid. Warnekros found most useful barium sulphate. First blood is permitted to escape freely, so that rupture of placental vessels through overfilling is avoided. A short exposure of three to five tenths of a second is sufficient. His observations permit the following deductions in regard to the mode and the time of detachment of the placenta: The placenta, as a rule, separates first at the edge, as always has been claimed by investigators in opposition to theorists. With but rare exceptions, the placenta reaches the internal os edgewise, and in this position glides into the vagina. Only in the vagina occurs the inversion which causes the placenta to appear outside the vulva exposing its fetal surface, or as customarily designated, in the Schultze mode. However, in a few pictures, the placenta was seen to detach first in its center, actually corresponding to the Schultze modus.

In accord with the more prevalent idea the separation of the placenta does not begin until the fetus is expelled from the uterus. Warnekros is forced to the conclusion that the detachment starts at the moment when the uterine muscle retracts over the escaping fetus, and is accomplished by the first few subsequent contractions, because in all his pictures, though taken within five minutes after the birth of the child, the placenta appeared completely detached. This was true even in forceps extractions, in which the general anesthesia probably had precluded strong contractions after the passage of the fetus.

Only in one instance he could photograph the placenta still in its normal attachment to the uterine wall. This was in a case of twins. Injection and exposure were finished before the second child had been born. The presence of the other fetus in the uterus, in his opinion, had prevented the retraction essential for the process of detachment.

This particular case, in his belief, also presents the strongest possible proof that the injection of fluid into the umbilical vein does not, as has been claimed by some, actually cause the very quick separation of the placenta uniformly ascertained in his pictures.

**Warnekros: Attitude and Mechanism of Expulsion in Breech Presentation.** *Archiv für Gynäkologie*, 1919, ex, 793.

Splendid roentgen pictures, presented in this article, show that also in breech presentations the fetus maintains a comfortable attitude, and that during labor the expelling force of the uterine fundus is actually transmitted by the vertebral column to the presenting breech. In Warnekros' belief this finally disposes of all objections raised by certain writers who have refused to accept the theory of such a transmission in pelvic end presentations.

**Weibel: Study of the Third Stage of Labor in Roentgenograms.** *Archiv für Gynäkologie*, 1919, cxi, 413.

Out of 41 attempts to photograph the placenta in the uterus, 28 proved eminently successful. Weibel with some right claims priority over Warnekros in these studies of the third stage. The terms "Schultze" (more correctly Baudelocque) and "Duncan" mode of placental detachment must disappear from obstetric nomenclature. The actual mode of expulsion of the placenta from the vulva has no relation to the mechanism of its detachment. The opinion, still defended by some writers that the separation begins during the stage of expulsion of the fetus, is untenable. In all normal labors, in which the final



expulsion of the child is chiefly accomplished by abdominal pressure, the placenta is found in complete attachment at the moment of the expulsion. Detachment begins immediately afterwards, either at the edge or in the center, possibly in some instances simultaneously over its entire surface. In sliding down, the placental edge reaches the cervix first, occasionally this edge is seen bent over. The mode of its final appearance is dependent upon changes occurring during its passage through the vagina.

**Warnekros: Spontaneous Change of Position of Fullterm Fetus during Labor.** *Archiv für Gynäkologie*, 1918, cviii, 475.

Two cases are represented in several roentgenograms, showing distinctly the spontaneous change of a breech presentation into normal head presentation in the course of the first stage of labor. This is the first graphic, and therefore unimpeachable proof for such a change of position which had been claimed as possible by clinical observations.

**Kreiss: Roentgenologic Pelvimetry.** *Zentralblatt für die gesammte Gynäkologie und Geburtshilfe*, 1914, v, 177.

With a new apparatus of Kehrler-Dessauer it is now possible to determine exactly the true conjugate. This, however, as a rule can be done only before the fifth month of pregnancy, and if the patient is not too stout.

**Vogt: Roentgenologic Proof of Extrauterine Life.** *Zeitschrift für Geburtshilfe und Gynäkologie*, 1918, lxxx, 344.

This is a problem of great forensic importance. Efforts in this direction were first made by Vaillant. While in the living newborn, before he has received any nourishment, intestines and stomach are not visible in the x-ray picture, in the stillborn they are clearly visible. Similar investigations also had been made in regard to the lung pictures of stillborn and living newborn infants. Some investigators came to identical conclusions, others felt unable to concur in the findings. Vogt studied the problem on a very large material. He comes to the conclusion that the method is of some value if used critically, but it is applicable only in cases in which no artificial resuscitation (especially swinging according to Schultze) had been attempted. The pictures must be taken very early before gases have formed as the result of beginning putrefaction. Otherwise grave errors cannot be avoided.

**Hess: Diagnosis of Age of Fetus by Roentgenograms.** *American Journal of Diseases of Children*, 1917, xiv, 397.

The stage of ossification of the skeleton of the fetus, as observed in roentgenograms, is of considerable practical importance in determining its age. The roentgenographic method is more reliable than the determination of age based on length or other measurements, since osseous development is more regular and offers many more features for consideration.

This determination of age is more accurate for the earlier than for the later months of development. However, this method is undoubtedly capable of greater refinement by further studies and observations. The chief forensic importance of this method to the obstetrician lies in the fact that under favorable conditions the age of the fetus can be determined even if only parts of a corpse are available for investigation. Also the pediatrician will be helped especially in feeding problems, if enabled to ascertain accurately the degree of prematurity.

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## Original Communications

### CERTAIN NEW CONCEPTIONS OF THE RELATION OF THE LIVER TO THE PROBLEMS OF ABDOMINAL SURGERY\*

A SUMMARY OF RECENT INVESTIGATIONS AND OF METHODS BASED  
UPON THEM WHEREBY THE MORTALITY OF ABDOMINAL  
OPERATIONS MAY BE DIMINISHED

BY GEORGE W. CRILE, M.D., F.A.C.S., CLEVELAND, OHIO

**W**HAT may be termed the "problems of abdominal surgery" are no longer concerned with such simple operations as the removal of an interval appendix, or of an acute appendix in advance of peritonitis, the removal of benign tumors, of stones in the bladder, or of uncomplicated gallstones. Operative technic in these operations is practically standardized and the patients come to operation with their normal factors of safety little if at all impaired.

Our problems lie rather among the so-called "bad risk" cases, patients in whom the margin of safety has been reduced by starvation, by infection, by the toxins of cancer, by autointoxication from obstruction of the bowels, from acute and chronic suppurating gall bladder or from acute and chronic peritonitis. To these may be added such extraabdominal conditions as interstitial nephritis with high blood-pressure, old age, cardio-renal disease, pulmonary tuberculosis, etc.

It is for such cases as these that we are seeking added means of control whereby to supplement our surgical resources. New consideration of these problems need not be concerned with problems of technic.

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\*Presidential address delivered at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Atlantic City, N. J., September 20-22, 1920.

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

with methods of suture or of approach, with anatomic considerations, with increased skill of manipulation, with the control of hemorrhage, with suture materials; these methods of attack have been mastered by the great abdominal surgeons of the past and the present generations.

Clinical and physiologic studies have yielded certain valuable data, such as the futility of stimulants and the advantages of blood transfusion, but they failed to discover the fundamental nature of the phenomena presented by these cases. We, therefore, endeavored to solve the problem by histologic studies in which we were continually confronted by the constant co-existence of the clinical phenomena of lowered vitality from any cause with certain histologic changes in the brain, liver,

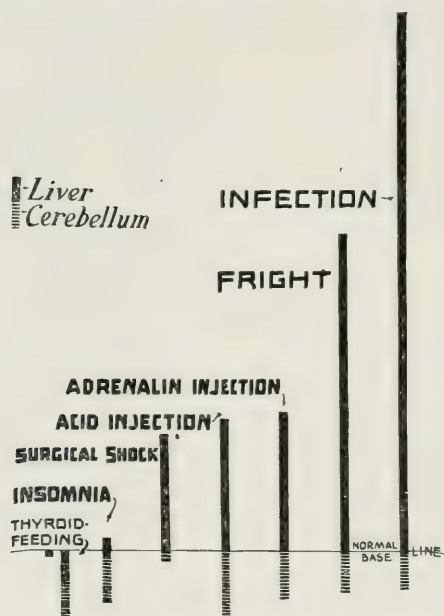


Fig. 1.—Percentile variations in the electric conductivity of the liver and cerebellum in exhaustion from various causes. (Note that the conductivity of the liver is increased, whereas the conductivity of the brain is decreased.)

and adrenals. The microscope could not reveal the nature of these changes; but since the histologic picture represented variations in the molecular concentration of the cell contents and changes in the nuclear and cell membranes, it occurred to us, especially in view of the studies of Osterhaut, Galeotti, Lillie, Loeb, and other physicists, that these cell changes might be more accurately studied and some light thrown upon the interrelation of the organs in which they occurred, by measurements of their electric conductivity.

To this end, the electric conductivities of 4,798 sections of tissues from 436 rabbits and 137 clinical specimens have been measured. After establishing the apparent range of conductivity of these tissues, especially the brain and the liver, in normal animals, under changing conditions,



including varying lengths of confinement, different seasons, etc., groups of rabbits were subjected to exhaustion from various causes: prolonged insomnia, extreme fright, physical trauma, surgical shock, infection, hydrochloric acid injection, thyroid feeding, iodoform poisoning, strychnine poisoning, prolonged ether anesthesia, and prolonged nitrous oxid anesthesia. We have observed also the effect upon the electric conductivity of the brain and the liver of the inception stage of surgical shock, of toxic shock, of strychnine and of adrenalin shock. We have observed the effects of sleep and of rest after prolonged insomnia and of morphine in the presence of infection. We have measured the conductivity of the brain and of the liver in rabbit fetuses, in newborn, and in young rabbits. These results are to be reported in detail elsewhere. The outstanding fact is that exhaustion from any cause, surgical shock, insomnia, emotion, fright, infection, etc., is marked by a *diminished conductivity of the*

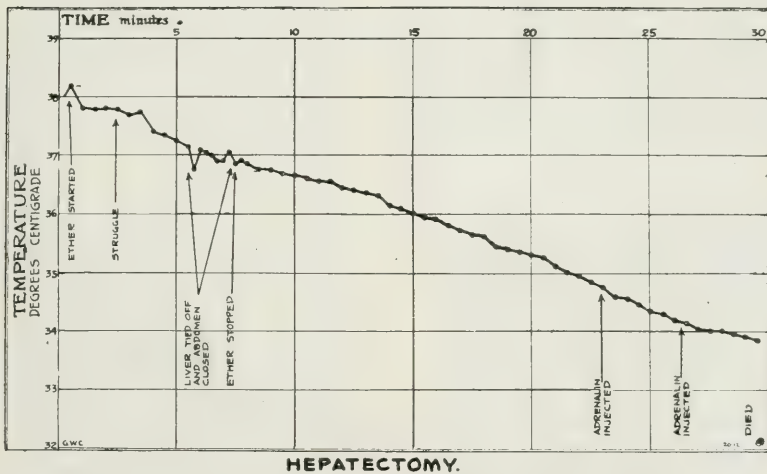


Fig. 2.—Temperature changes in the brain after excision of the liver.

brain and an increased conductivity of the liver (Fig. 1). With the excision of the liver, the tendency of all the tissues in exhaustion is toward a diminished conductivity. Restoration, when it is accomplished by long periods of rest after insomnia, is marked by an increasing conductivity of the cerebrum and cerebellum toward the normal and decreasing conductivity of the liver toward the normal.

In brief, the findings in our researches which bear directly upon the relation of the liver to the functional activity of the brain may be summarized as follows:

(a) After excision of the liver, the power of the brain to drive the organism to transform potential energy into kinetic energy, such as heat or muscular or mental action, is rapidly diminished and completely lost at the time of inevitable death, usually within a few hours.

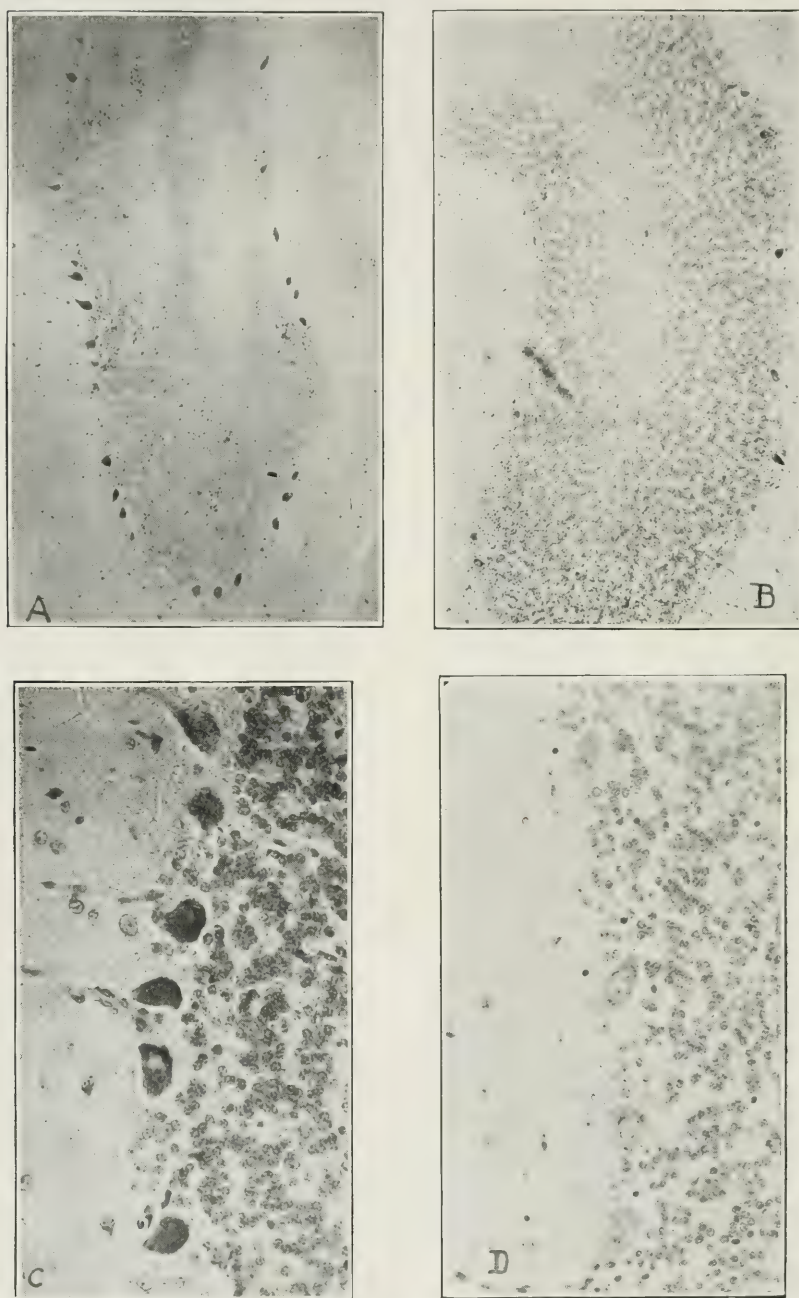


Fig. 3.—Cytologic changes in the brain cells after excision of the liver. *A* and *C*, section of normal cerebellum of a dog. *B* and *D*, section of cerebellum of a dog whose liver had been excised. (*A* and *B* from photomicrographs x85. *C* and *D* from photomicrographs x310.)

(b) After excision of the liver, the temperature of the brain falls progressively until death (Fig. 2).

(c) The brain-cells show changes in the cytologic structure which are progressive from the moment the liver is excised (Fig. 3).

(d) In every type of exhaustion from whatever cause, the cells of the liver show cytologic changes, such as diminished power of differential staining, edema, and increased electric conductivity (Fig. 4).

(e) Granting adequate circulation and respiration in a decapitated animal, the excision of the liver causes death earlier than decapitation or adrenalectomy.

From these findings we may suppose that the integrity of the liver is essential to the work of the brain, just as the integrity of the liver is essential to the elimination of the acid by-products of metabolism by the kidneys and the lungs. When the liver is excised, the blood tends to become acid as the animal approaches exhaustion. Neither the transfusion of blood nor the administration of adrenalin or of morphine exerts the least check on the exhaustion and death which follow excision of the liver.

For its oxidizing and reducing power, the liver apparently depends, in part at least, on the adrenals; for the excessive intravenous injection of adrenalin on the one hand, and adrenalectomy on the other, cause marked cytologic changes in the liver cells—chromatolysis, edema, eccentric position of the nucleus.

As noted above, in our electric conductivity studies we found that in exhaustion from any cause the liver and the brain were affected in opposite directions, i.e., in extreme exhaustion the conductivity of the brain was decreased and the conductivity of the liver was increased. In the earliest stages of stimulation these changes were reversed, the period of increased conductivity of the brain apparently corresponding to the period of hyperchromatism established by our histologic studies.

From these premises we conclude that the liver is inseparably associated with the brain in the production of shock and exhaustion; but as the liver has no means of immediate contact with the external excitants of shock and exhaustion, it apparently in some way is influenced indirectly through the mediation of the brain.

If our premises regarding the interrelation of the brain and the liver are sound; i.e., if the liver is the key to the chemical stabilization of the brain cells, it follows that when the margin of safety has been reduced by diseases of the liver, such as sclerosis, an abscess, a tumor, infection, or jaundice, by starvation or emaciation, by want of water equilibrium, by loss of sleep, or worry, or fatigue from exertion, etc., then the liver must be protected against an increased burden of work such as worry, dread, muscular exertion, the trauma of operation, or pain during or after operation. These factors are excitants of metabolism; excitants



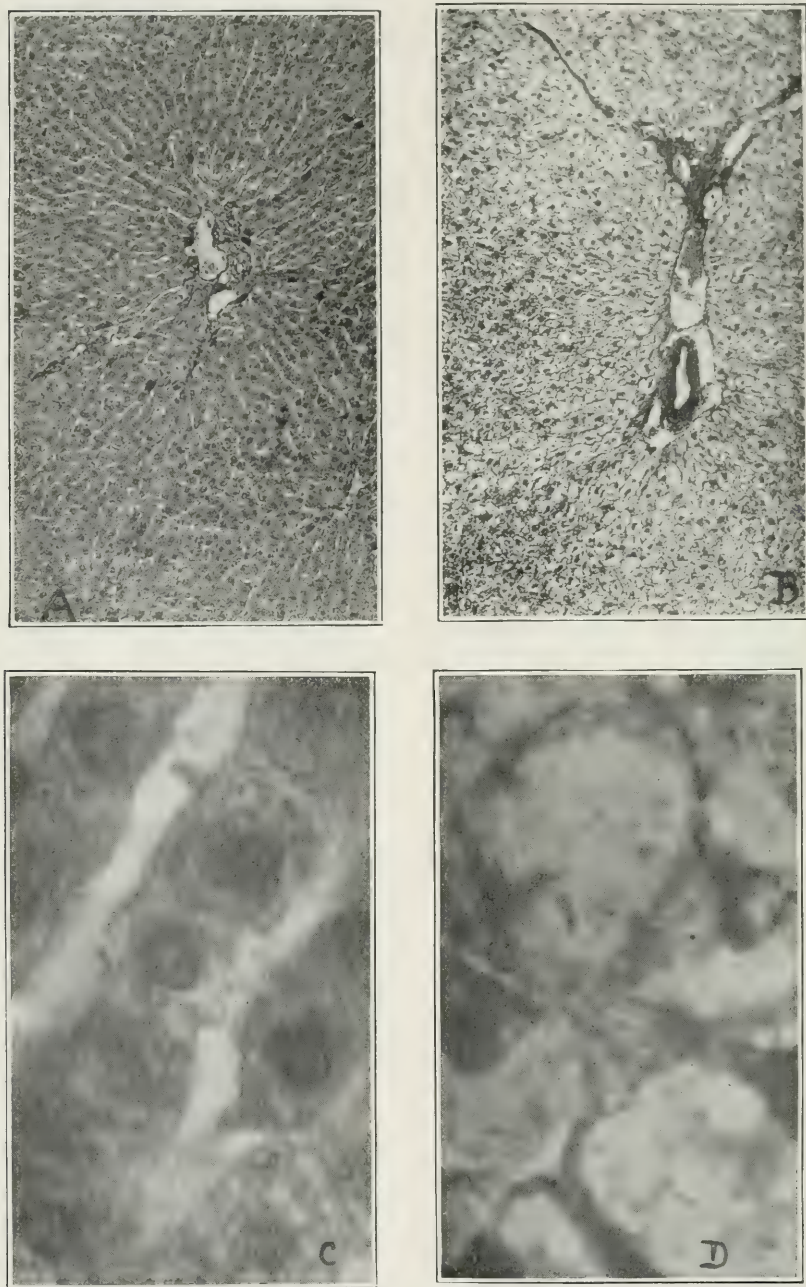


Fig 4.—Cytologic changes in the liver cells in exhaustion. *A* and *C*, section of normal liver of a rabbit. *B* and *D*, section of the liver of a rabbit exhausted by continuous insomnia for one hundred hours. In *B* and *D* note vacuolated spaces and general disappearance of the cytoplasm, and in *D* the eccentric misshapen nuclei. (*A* and *B* from photomicrographs  $\times 100$ . *C* and *D* from photomicrographs  $\times 1640$ .)

of metabolism increase the work of the liver; increased work of the liver must be avoided.

Our studies, moreover, indicate that the excitants of metabolism are not the only cause of increased strain upon the liver and the nervous system. Activity of the liver cells is interfered with also by whatever interferes with the internal respiration; e.g., a failing circulation of the blood from impaired heart action, myocardial weakness, or valvular lesions. Any heart deficiency which lessens the circulation of the blood in the liver and therefore diminishes the internal respiration of the liver cells, is best met by the early administration of digitalis in approximately the following dosage: 20 minims every four hours for twelve doses. If the patient has not improved sufficiently after two days, this dosage is repeated.

Another common interference with the internal respiration of the liver is impairment of the pulmonary exchange, as in asthma, in emphysema, in pleurisy with effusion, in pulmonary tuberculosis; in the presence of a lung abscess or an empyema tumor in the mediastinum, in internal and external obstructions of the trachea, in short, fat, stodgy, stertorous alcoholics, whose breathing is normally a wheeze, and who are normally in a state of suboxidation. A patient in whom any one of these conditions is present must be treated with the utmost care in order to protect the internal respiration of the liver; as must, also, patients whose internal respiration is diminished by primary or secondary anemia. Such patients endure with difficulty increased metabolism from any cause, or any further interference with their internal respiration.

In the course of operations the most important single cause of interference with the internal respiration is the inhalation anesthetic. Dr. Menton and I showed that all inhalation anesthetics cause an increased H-ion concentration of the blood; that is to say, an increased acidity. Increased acidity interferes directly with the internal respiration. Moreover, in the case of ether anesthesia, there is also an enormous decrease in the permeability of the cell membranes, so that the internal respiration is entirely cut off. Temperature measurements with the thermocouple showed an astonishing fall in the temperature of the brain under ether anesthesia, as rapid a fall as that which followed the excision of the liver (Fig. 5-A). It is a fact of extraordinary interest that either excision of the liver or complete surgical anesthesia by ether causes death in about an equal length of time; and that if the blood pressure and respiration be maintained, animals live longer after decapitation than under ether anesthesia, or after excision of the liver. In its physiologic results, therefore, full ether anesthesia is the equivalent of the removal of the liver.

On the other hand, nitrous oxid-oxygen anesthesia presents a totally different picture (Fig. 5-B). The temperature of the brain scarcely changes; and the internal respiration is only slightly disturbed. Nevertheless, in heavily handicapped patients, even full nitrous oxid anesthesia

is not wholly safe. The safe method in such cases as we have listed above is nitrous oxid analgesia, combined with complete local anesthesia. In addition, the loss of temperature of the liver by the cooling of the blood which passes to the liver from the exposed intestines should be prevented as far as possible. The evil effects of cooling the liver and the good effects of warming the liver are obvious, but are strikingly illustrated by our temperature measurements, in which it was significant to note that the introduction of hot water into the stomach was followed by an immediate increase in the temperature of both the brain and the liver, *the increase in the brain occurring first* (Fig. 6.).

Up to this point we have dealt with experimental results, with the everyday observations of the clinic, and with certain theoretic deduc-

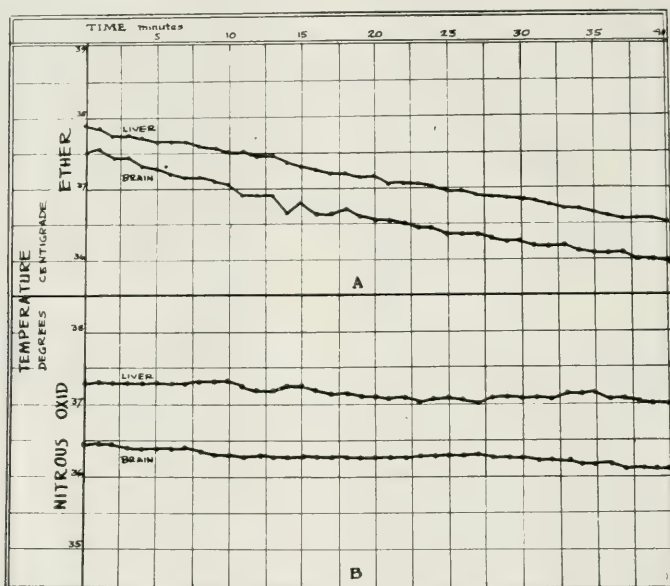


Fig. 5.—Comparative changes in the temperature of the brain and the liver produced (A) by ether anesthesia, (B) by nitrous oxid-oxygen anesthesia.

tions. But the practical value of an experimental research, or the applicability of a theory is to be found only by its test in the crucible of the clinic. In accordance with these principles, therefore, we have adopted the following general scheme for the management of abdominal operations:

1. The control of fear and anxiety, if not by management, then by a moderate dose of morphine.
2. The use of nitrous oxid-oxygen anesthesia.
3. Regional blocking by local anesthesia.
4. A feather-edge technic.
5. Keeping raw tissue covered as much as possible.
6. Prevention of loss of blood.
7. Prevention of loss of body heat.



8. In addition to the inhalation anesthetic, local infiltration is also employed, to promote relaxation of the abdominal muscles. If relaxation is not complete, ether is added, but is discontinued as soon as the requisite degree of relaxation is secured.

9. As we have emphasized, nitrous oxid-oxygen is the anesthetic of choice. In the absence of a specially trained anesthetist, however, ether may be required, in which case Gwathmey's warmed vapor method with local infiltration is the method of choice, so that the least possible amount of ether will be used.

10. If there is free blood, as in military surgery, Major Taylor's plan of leaving the blood in the abdomen until the intestinal technic is completed seems sound. Apparently, the free blood serves as a measurable protection against damage from the exposure to air.

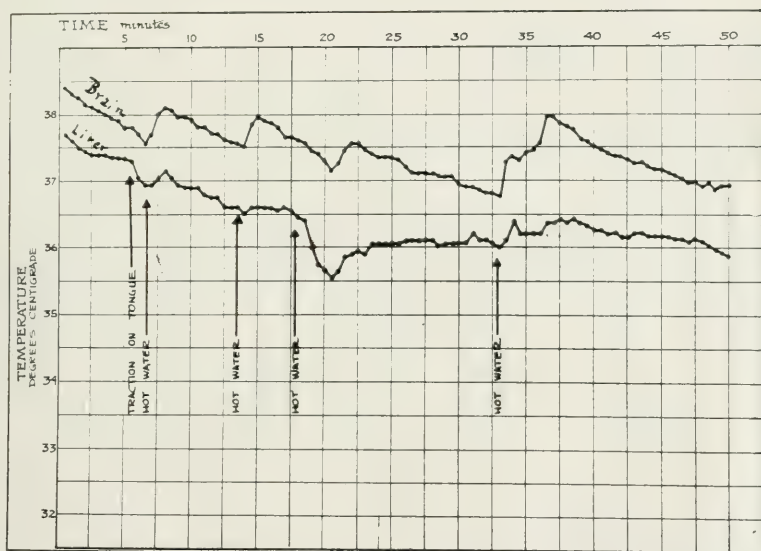


Fig. 6.—Changes in the temperature of the brain and the liver produced by the introduction of hot water into the stomach.

11. A shock patient is turned from side to side as little as possible during operation, as has been emphasized by Major Gregory Marshall.

12. The abdomen is kept open the least possible length of time.

13. Manipulations and exposure of the viscera are reduced to a minimum; therefore, an ample incision is made.

14. If a patient is in deep shock, some blood is transfused at the beginning and more at the close of the operation.

15. In certain cases, if debility is marked, and the operation is such as to interfere with the physiologic balance of the patient, as in resections of the stomach, intestines, or gall bladder, it is advisable to perform the operation in two seances, the second major step being taken after the nutritional balance is well established.

16. In starved cases from cancer, or in grave risks, nitrous oxid is

used only to provide analgesia, and anesthesia is secured mainly by local anesthesia.

17. If, as we believe, the liver is the key to chemical stabilization, and since chemical activity is increased by heat, then heat applied to the entire abdomen both before and after operation in bad risk cases increases the temperature of the liver, thus increasing its metabolism. This increased metabolism of the liver, in turn, defends the organism as a whole. Thus far the clinical experience seems to bear out this assumption.

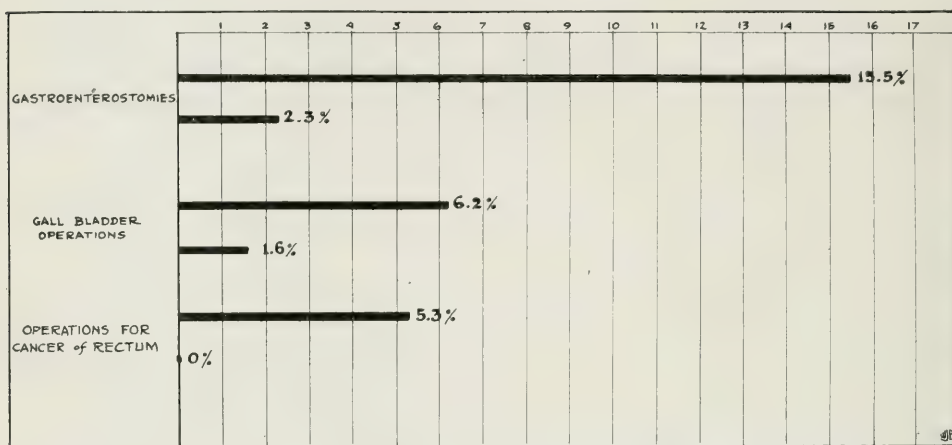


Fig. 7.—Comparison of mortality of bad risk cases before and since the application of the physical interpretation.

COMPARATIVE MORTALITY TABLE

	PRIOR TO APPLICATION OF PHYSICAL INTERPRETATION			SINCE APPLICATION OF PHYSICAL INTERPRETATION		
	NUMBER OF CASES	DEATHS	RATE	NUMBER OF CASES	DEATHS	RATE
Gall bladder and common duct operations	389	34	6.2%	62.1	1	1.6%
Gastroenterostomy and resection of the stomach for cancer and ulcer	110	17	15.5%	43	1	2.3%
Colostomies and Radical operations for cancer of rectum	30	3	10%	44	0	0%

By the observance of this general plan of management, always adapted to the requirements of the individual patient, the mortality rate for bad risk patients has been markedly lessened and the range of operability extended, as is shown in particular by a comparative study of the case histories of my personal series of bad risk cases, including 153 gastroenterostomies and gastric resections, 451 gall bladder operations and 74 operations for cancer of the rectum, in which comparison is made between the series prior to the application of the principles stated above and the series since the practical application of these principles (Fig. 7).

## SOME INTERESTING SURGICAL CONDITIONS OF THE LIVER AND BILIARY TRACT\*

By JOSEPH H. BRANHAM, M.D., BALTIMORE, MD.

THE gall bladder is ordinarily the seat of surgical conditions in this region because of the inherent susceptibility of this organ, due to anatomic peculiarities. The underlying feature of the surgical condition is usually some form of infection which may be induced, first, through the blood stream, or by direct extension along the common and cystic ducts; second, cholelithiasis, which, however, is nearly always secondary to infection. Traumatism and tumors are comparatively rare. Gallstones are nearly always formed in the bladder, but may also form in the ducts.

What shall be done with a diseased gall bladder? In my papers read before this Society in 1913 and 1917, I predicted that cholecystectomy would become the operation of choice. This prediction has come true. When an operation is necessary, the organ is already diseased. The value of a normal gall bladder is not very great; its influence on the digestive process is slight and uncertain. As a reservoir it has some value and after its removal there is a compensatory dilatation of the common and hepatic ducts. Animals which have no gall bladder have large, distensible ducts to take its place. A healthy gall bladder should never be removed, nor should it be subjected to operation. When symptoms are severe enough to demand operation the organ in most cases is so diseased as to be of little or no value, and is a menace to future health.

The question of reoperation in gall bladder disease is ably discussed by Dr. John W. Deaver in the *Journal of the American Medical Association* of April 17, 1920. He reports reoperation in 10 per cent of cholecystostomies and 1.3 per cent of cholecystectomies. The reports from the Mayo Clinics are similar. A few years ago, cholecystostomy showed less mortality. This is now reversed because the operation is now done in extreme cases of severe infection of the gall bladder with complications. The reoperations are necessitated by recurrence of stones, by adhesions, and by fistulæ. The first are much more common after cholecystostomy, but may occur in the ducts after cholecystectomy. Adhesions of such a character as to require reoperation, because of pain or interference with the mobility of the stomach or intestines, result, in most instances, in severe cases which are associated with suppurative peritonitis and which require long continued drainage. In such cases

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\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.



the adhesions are caused by the primary condition and not by the operation. I do not believe that, in a given case of gallstones or cholecystitis, adhesions should be more frequent or severe after removal than after drainage, provided the removal is done carefully.

For several years I have operated by a method that is practically sub-peritoneal. I have not seen this method described, but do not doubt that others may have used it. It is briefly as follows:

After the abdomen is opened the ducts and neighboring organs are carefully examined; this can usually be done by palpation. If the disease is confined to the gall bladder, an oval incision is made over the lower anterior surface of the organ; the peritoneal coat is dissected from the deeper tissues; when the duct is reached it can always be recognized by the well-marked sphincter. A considerable margin of the peritoneal coat is left at the liver attachment; the duct is severed and, after being explored and emptied of stones, etc., a large catheter is fastened to it with a twenty-day catgut suture. The peritoneal coat from each side is stitched together and then to the ventral peritoneum. This leaves the catheter outside the peritoneal cavity and gives a smooth serous surface to cover the entire wound, thus preventing adhesions. By confining the incision to the accessible part of the organ, the suturing is made easier. A small cigarette drain left in for one or two days is all that is needed in most cases. Operations performed in this way are rarely followed by adhesions and the patients are usually left in good condition.

Fistulæ opening from the gall bladder or ducts into the small intestine or colon, and in one case (reported in this paper) into the stomach, are often the cause of secondary operation. When the adhesions are very dense and extensive, gastroenterostomy gives the best permanent relief. Failure to close the drainage tract which in most cases, like the above, is due to obstruction by stones or stricture, may necessitate reoperation.

CASE 1.—Mrs. K.; aged forty-nine; white; came under my care in the early part of the winter of 1908. She had marked ptosis of the liver and a large tumor connected with its lower anterior surface. This was thought to be malignant. Operation, December 18, 1908. On opening the abdomen a tumor half as large as a man's fist was found. It was in the lower abdomen and dragged the liver, to which it was attached, down to such a degree that an elastic tube could be placed above it entirely cutting off the blood supply and making the removal bloodless. The liver wound was snugly closed by mattress sutures. The patient made a quick recovery. Microscopic report showed gumma. Similar cases occurred in the practice of two prominent surgeons in Baltimore about the same time. Routine Wassermann examination will, probably, prevent such mistakes.

CASE 2.—E. C., aged fifty-six; white; entered Franklin Square Hospital during the summer of 1914 with a history of recurrent attacks of pain in the gall bladder region associated with jaundice. Operation: cholecystostomy. At that time the gall bladder was very much damaged and I thought it should have been removed, but this was not done because of the patient's depressed condition. Patient was relieved for a time from the symptoms and remained in fair health. Later, gall

bladder trouble appeared. Several of these attacks were very severe and associated with high fever. Suffering became so acute that the patient re-entered the hospital May 13, 1919. Operation at this time revealed a very much thickened gall bladder, filled with stones and closely adhering to the stomach. The gall bladder was removed and, in separating it from the stomach, a fistulous opening was found between the two organs. The patient was relieved temporarily, but soon had a return of the pain and was operated a third time, December 20, 1919, when several very large stones, packed in sand-like material, were removed from the common duct. Several other stones were discharged during period of drainage. The fistula has healed, and the patient's general condition is improved. Before the second operation the patient suffered from frequent and severe attacks of biliary vomiting. Dr. Deaver refers to the occurrence of such cases in his paper.

CASE 3.—Mrs. K.; aged nineteen; white. Operated, June 21, 1920, for suppurative salpingitis; vaginal puncture and drainage; condition followed confinement and ran a subacute course. Adhesions very dense and relief only temporary. On July 31, the abdomen was opened and the left tube removed. Ten days later this was followed by an enterostomy for obstruction. At this time the patient was *in extremis*, but she soon rallied and gained strength very rapidly.

August 14, 1920, this patient was suffering with classical symptoms of acute gall bladder abscess, jaundice and toxemia very marked. Cholecystostomy. Gall bladder very tense; anterior part filled with turbid fluid; posterior part with thick pus; anterior lining membrane pale, the posterior one, near duct, markedly congested; a small stone was discovered in the duct near the gall bladder. The improvement was immediate and the patient is now at home and in good condition. Drainage of the bladder seemed best in this case because of the low vitality of the patient and because the organ was little changed.

## WHERE THE RUBBER GLOVE IS BEHIND THE TIMES\*

BY ROBERT T. MORRIS, M.D., F.A.C.S., NEW YORK, N. Y.

WHEN men smile and agree, progress weeps. At the present moment many men, who would like to express themselves freely on the subject of the rubber glove, are afraid to do so because of complications which might arise in connection with hospital politics and because of social reactions relating to a convention or established habit in thought. As civilization becomes more and more complex there is a tendency toward standardizations. Standardization represents a natural reaction to radicalism, a necessary reaction to radicalism which, like the rush of antibodies to a point of irritation, may sometimes result in autolysis and destructive end result. The rubber glove belongs to standardization and is one of its most valuable adjuncts. The standardization idea in every field of human activity represents a great moving force of recognized value. It reaches limitations. A locomotive represents a great moving force. It reaches limitations at the end of a track at a station. If it keeps right on past its limitations it may smash the station. Standardization reaches limitations when it smothers individuality. Some of the labor unions furnish an object lesson. Picture Darwin standardized to fit the thought of the Established Church of England of his day.

Surgeons, being human, cannot escape human movements and behavior. Whenever we have a high degree of civilization a great deal of painstaking attention is required before men can reach the common level in any sort of professional work. What does this mean in our profession? It means that by the time when all doctors are pretty well agreed upon the desirability of any one resource they are often behind the times. The very best men get behind the times for the reason that their good qualities, recognized by so large a part of the community, have brought them so much occupation that it has been impossible for them to follow new leaders of thought. They are prone to depend upon tradition. Tradition is the greatest of guides for minds of the mean type and the meanest of guides for minds of the great type. Neurology and psychiatry were beginning to make progress along the lines of objective teaching of Virchow when along came the blight of Freudian mysticism throwing many psychiatrists back to the days of Schelling and Hahnemann in the middle of the last century. Surgeons were getting fairly under way with the principles of the fourth era of surgery when along came the rubber glove acting as a blight upon a rapidly growing subject. Almost all fads have a basis in good fact. The rubber glove had a large basis in good fact, representing one of the most important advances in sur-

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gery. It reached limitations, ran off the track, and exerted destructive influence upon the fourth era of surgery in its relation to abdominal work. It is in this particular field that the rubber glove is behind the times.

What is the fourth era of surgery? The first era was heroic. Then came the anatomic era. Following the anatomic era, Pasteur and Lister introduced the third or pathologic era. That, was the one in which the surgeon disregarding Nature's resources, attempted to remove bacteria and their products by means of his own resources. He conscientiously acted like the faithful ape that tried to destroy the fly upon his sleeping master's forehead, using a big stone for the purpose. Wright and Metchnikoff then gave us materials which allowed us to construct the basis for a fourth or physiologic era of surgery. That era into which we are just now emerging gives the patient Home Rule. The patient is turned over to himself with the least possible degree of injury to his natural protective resources. He is allowed to manufacture phagocytes and opsonins freely and this he does when there has been the least degree of shock to throw the belt from the wheels of his endocrine machinery.

With the introduction of the rubber glove came the longer incision in abdominal surgery. We could see incisions grow in length as rubber gloves became more and more widely adopted. Abdominal surgeons lost their cunning because the sense of touch was interfered with to such an extent that it became necessary for them to do much of their work by the sense of sight, a sense that is recognized as standing second rate to the tactile sense in certain matters of precision. Before the days of rubber gloves there were surgeons, to be sure, who used long incisions and who worked by sight in abdominal surgery, but these were not the ones who had the best results. In that day surgeons, like Lawson Tait and Joseph Price, who worked through small incisions rapidly were the ones who had the best results; Tait, in particular, not only disregarded rules of asepsis and antiseptis but openly railed at them. We could not understand the meaning of the good results of Price and Tait at a time when the colleges were teaching the principles of asepsis and antiseptis. Today we know. The principles of the fourth era of surgery were empirically brought into play by surgeons who worked rapidly through small incisions.

In order to determine the degree to which rubber gloves actually interfered with the tactile sense, I had tests made by an expert upon several physicians and surgeons. The tests all showed a lowering of the tactile sense, even on the part of very expert surgeons and, curiously enough, the physician who stood highest in the tests was not a surgeon but a specialist in the diseases of children.

Dr. T. L. Bennett, the anesthetist, has stated that according to his observation the best surgeon is the one who acts all the while as though he were afraid of waking the patient. Long incisions and thorough examination of viscera wake the patient. Deeper anesthesia becomes neces-

sary. In natural sequence perhaps to the long incision and working by sight came the later development of thorough examination and exploration of the abdomen with the surgeon's hand introduced through the incision. This in turn had a tendency to lessen the cunning of the diagnostician. It is the forte of the diagnostician to make accurate conclusions in regard to the sites of disturbing factors in advance of operation. When this has been done one or two small incisions frequently allow work to be done more gently and rapidly and more directly to the purpose than is possible through a long comprehensive incision.

No method in surgery is static. We change from one method to another. We have done this in the past and will continue to do so for thousands of years to come. It is my belief that the long incision which belongs to the rubber glove is not static. Surgeons will awaken again to the principles of the fourth era of surgery which, like objective psychiatry, has received a temporary set back.

Does the rubber glove lessen the number of bacteria that are actually carried into an abdominal wound? We may answer that question by way of an object lesson offered by the exposure of culture media in Petri plates in the operating room. The larger the Petri plate the more complete the infection of its contents. The longer the exposure of the Petri plate the more complete the infection of its contents. This infection comes from where? From bacteria falling from the air into the culture medium. More bacteria fall into a large abdominal incision from the air than are carried in by well prepared hands wearing no rubber gloves. We must remember that most of the bacteria which fall into a wound from the air or which are carried in by the hands are destroyed or at least rendered latent by the enzymes of the wound. In addition to the shock caused by the long incision and by thorough examination of viscera, danger from emboli and from postoperative adhesions is greater in degree proportionately to the length of the incision and the length of time expended in operating.

Dr. J. W. Kennedy of Philadelphia, states that in a review of one thousand re-operations of the abdomen in his own experience ninety-nine per cent showed adhesions to the scar or in the immediate neighborhood of the scar in patients who had been operated upon previously by men who wore rubber gloves. He states that in his own work only seven per cent of re-operations showed any signs of adhesion to the scar or in its vicinity. Some of the ninety-nine per cent of incision line adhesions were doubtless due to the employment of irritating antiseptics for skin preparation of the abdomen. Iodine, for example, valuable as it is, if not removed with alcohol in advance of operation will do to endothelium what it does to epithelium. This fact does not lessen the force of the idea that the longer an incision the more injury to endothelium.

Rubber gloves have incidentally been a factor in making this a day of instruments in the abdominal cavity. We are prone to forget that the peritoneum with its lymph system is better equipped than is the

skin for resisting infection. The extent to which the peritoneum will ward off or control infection is remarkable provided that it is not shocked by a blow below the belt. The peritoneum may even wall in material which escapes from a perforated appendix or pylorus or typhoid bowel. Many a surgeon knows this fact but he keeps it walled in. He might have a chill if the fact were suddenly to break through into his thought cavity.

In cases of appendicitis with abscess the plan of making a short incision and of running when pus ran reduced the death rate to such an extent that Dr. L. W. Hotchkiss of New York had a series of seventy-six appendicitis operations without a death at a hospital in which the previous death rate in the same class of cases had been thirty-one per cent. In pyosalpinx cases, when working through a short incision after the first acute stages of infection have been brought under control, one may shell out the damaged tubes, split them and fasten them to the anterior abdominal wall and allow the pus to pour out of that exit until the patient responds to vaccine treatment. Six months afterward the abdomen may be reopened, adhesions separated, and the tubes or remains of tubes dropped back into the pelvis, and the patient may then have children. It is true that some of the pregnancies will be extra-uterine but the patient, warned of that, is not in great danger because we easily care for an extrauterine pregnancy in its early stages. On the other hand there will be more happy mothers with good babies borne than we find to be possible when a surgeon wearing rubber gloves and working through a long incision commits devastating surgery in the pelvis.

In cases of acute typhoid bowel perforation or gastric ulcer perforation, a two minute operation by a surgeon wearing no gloves will give better service than a thirty-minute operation on the part of a surgeon wearing gloves and working by sight.

Do not mistake the intention of this paper. It does not stand in opposition to the idea of the rubber glove which, in my opinion, represents one of the best advances of the surgery of the day. Personally I use the rubber glove, observing the latest decrees, in practically all of my surgery, with the exception of the peritoneal cavity and when dealing with malignant disease. The rubber glove is behind the times when it comes into conflict with the principles of the fourth era of surgery in abdominal work. If conscientious surgeons are behind the times today in their employment of rubber gloves in abdominal work it is not their fault, it is the fault of a public which fails to endow our educational institutions in such a way as to teach young surgeons among other things the difference between the peritoneal cavity and the synovial cavity of the knee joint in regard to their respective responses to injury, mechanical or bacterial.



## THE GEHRUNG PESSARY FOR THE RELIEF OF CYSTOCELE\*

BY EDWARD J. ILL, M.D., F.A.C.S., NEWARK, N. J.

IN Vol. XIII, page 513 of the *American Journal of Obstetrics and Diseases of Women*, there appeared an article on "The Mechanical Treatment of Cystocele and Procidentia Uteri" by Eugene C. Gehrung of St. Louis. How much attention was paid to that excellent paper we do not remember. Suffice it to say that contemporary gynecologists know little about it, and still less about the use of Gehrung's pessary, which in our hands has been so valuable in the relief of many patients.

The writer is aware that papers which do not describe new operations are rarely popular. But now and then it is wise to hearken back to the older writers and find out what they did to relieve suffering women when gynecologic operations were in their infancy and fraught with great danger. The writer has lived through the period when the pathology and anatomy of the pelvic organs was little understood. Treatment was often empirical and not founded on a true understanding of the pathology. The writer does not say that we, at the present day, know it all, there is still much to be learned. Let those who ridicule the forefathers beware that a like punishment may not fall upon themselves. The more we advance in years the greater becomes our respect for our predecessors. Instruments of precision were few. The laboratory, the refuge of the unobservant, did not exist. Physiology, the clinical picture, and the physiognomy of disease, were the main reliance in diagnosis. All these cannot be supplanted by the laboratory. The writer has no desire to decry the laboratory and in his own community he was the first to develop and employ its facilities. This acknowledgment is made so that he may not be misunderstood in his advice to hearken back to the older authors in looking for relief for his patients when operations are out of question. Among these we find the old and decrepid, those with decompensated cardiac disease, and those with diabetes or advanced renal lesions. Then we have those with pulmonary affections contraindicating anesthesia, and lastly the timid ones.

The writer has not grown timid in his latter days. His enthusiasm often needs the curbing of sounder judgment and often reconsideration, and he never forgets the rule: "put yourself in the patient's place." To introduce to you so old a subject as the Gehrung pessary needs some excuse; but more than that, a deep-seated and mature consideration of its value. There are many expert gynecologists who decry the use of any pessary because of ignorance or selfishness, or because they be-

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lieve it is harmful. Let that be as it may. A rehearsal of the case that prompted this paper will suffice to act as an excuse for its infliction. Mrs. E., aged fifty-six years, was referred January 3, 1914, by a Pittsburgh friend and a gynecologist of high standing. She had changed her domicile temporarily from that city to one in the writer's neighborhood. She had suffered much with cardiovascular disease and a cystocele that gave her great annoyance. She was a heavy, stout woman, who soon grew cyanotic on the examining table. Her systolic blood pressure was 220, though her urine was fairly normal. An operation was out of question, and this my Pittsburgh friend had already decided for me. We introduced a well fitting Gehrung pessary in her case, which not only gave her great relief, but made exercise so bearable, that it improved her general health. Of course the instrument was carefully looked after, as all pessaries should be.

In due time she returned to Pittsburgh to find that her doctor could

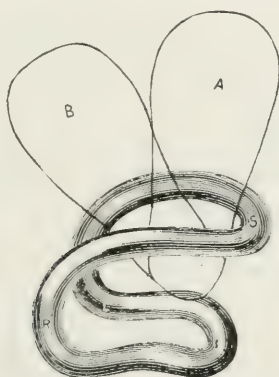


Fig. 1.—Showing position of the Gehrung pessary in relation to the uterus (A and B). S, Symphyseal end; L, left; R, right arm.

not replace the instrument after he had removed it. He had never seen such an instrument. And well might a man be puzzled with it. The woman returned to Newark to have the instrument replaced. Later her family moved to Virginia, near Washington, but to my dismay she again returned to Newark because no one could be found to replace the instrument properly.

It is not the writer's intention to read to you his views as to the interposition operation of Watkins; suffice it to say that nothing has given him greater satisfaction, and to his patients greater relief, unless it be the operation for vesicovaginal fistula or the repair of a complete perineal laceration. You will understand, therefore, that this form of pessary is purely for those cases where an operation is not advisable.

The pessary consists of the Hodge instrument bent on itself so as to form a double horseshoe, one lever being a little shorter than the other. Its object is to hold up the anterior wall of the vagina and, with it, the bladder. Dr. Gehrung's views of the causation of the cystocele are

based on the hydraulic pressure extended on a vagina which had lost its anterior fixation. In his own words: "If the bladder can be returned and held in its normal place, the procidentia as such must be cured." There are some cases where the pessary will not do what we expect of it, nor will it even be tolerated. First among these is extreme relaxation and atrophy of the pelvic floor; second, deep, hard, and unyielding scars in the lateral fornices; third, the atrophic vagina as shown by its stringy character; and last, the various forms of procidentia with their concomitant hypertrophy. To men of experience this needs no further elaboration.

The position of the pessary is such that the smaller horseshoe or lever will be placed anterior and below the cervix, while the larger one will be just above the neck of the bladder. The junction of the two horseshoes will remain in both lateral fornices. To fit well the pessary should be freely moveable and not felt by the patient on walking or sitting down. In fact she should not be conscious of wearing the instrument except that she is comfortable, that she has lost the dragging sensations and the irritable bladder.

The introduction of the instrument is rather difficult to describe. The pessary is held between the thumb and the fingers of the right hand by the rounded end of the horseshoe, the smaller one being forward. The connection between the horseshoe to the patient's left is introduced first and then with a rotary motion of  $180^\circ$  the whole pessary is slipped into the vagina where another rotation of  $180^\circ$  will put it in place. Care should be taken that neither horseshoe slips behind the cervix in which case it will have to be removed and reintroduced, for the cervix will form a bar over which the pessary cannot be slipped. Its position is best shown by Gehrung's woodcut or by the illustration in the Tieman & Co. catalogue. It goes without saying that experience and trial only can determine the proper size of the instrument to be used for each case. It is better to start with a small size pessary and allow the patient to walk about the office as a test, than to use a large size instrument which may produce pain and injury. Gehrung says: "The pessary acts by a close application to the anterior and lateral walls of the vagina. It gets its inferior support on the lateral parts of the perineum." Those who will take the trouble and patience to master it will find great satisfaction for themselves and secure immeasurable relief for their patients. The great objection to the pessary is that while the patient can remove it she cannot replace it, Gehrung to the contrary notwithstanding.

It is not within the province of this paper to criticize that which we take to be in error in Gehrung's paper. Possibly it will be better to say that we have not been able to do all that he has succeeded in doing. My object is simply to show how we may hold up the anterior wall of the vagina with a properly fitted Gehrung pessary.



## ENDOCRINE INFLUENCE, MENTAL AND PHYSICAL, IN WOMEN\*

BY JAMES E. KING, M.D., BUFFALO, N. Y.

MUCH of what is known in medicine has developed from theory. In every branch of medicine theory has formed a basis for observation and experimentation, leading to the establishment of some of the most important facts. Theories may arise entirely from the imagination, or, as is usually the case, a few known facts may inspire and suggest the theories from which are evolved the missing facts necessary to complete the knowledge. Even theories disproved possess in a negative way great value. Granting, therefore, the importance of theory in the progress of medicine, it is justifiable when all facts are not known, to evolve theories to interpret the phenomena of health and disease. Let this, therefore, be the excuse for presenting some fact and much theory upon the subject of the endocrine system and its influence upon the mental and physical characteristics of woman during her reproductive life.

At present no question in medicine is receiving greater and more deserved attention than the ductless glands. Twenty-five years ago they were not suspected of having any important function; today we are ascribing to the activity of these glands many mental and almost all physiologic processes and every department of medicine is seeking to establish its relationship to the endocrine system. The subject affords an interesting and fruitful field for speculation and experimentation and, as a result of the efforts of a host of observers, some real knowledge is being accumulated. Every new fact affords a nucleus for new theories, until the student of endocrinology now finds himself wandering in a hopeless maze.

The biologist has reduced the laws of life to two great fundamentals: the preservation of self and the propagation of kind. For self-preservation are found various adaptations for self-protection, to which may be added the elaborate mechanism for metabolism necessary to existence. The higher in the scale of animal life, the more complicated these processes, until in man is found a brain capable of reasoning, by virtue of which he has attained his position superior to all other forms of life. There is now no question as to the influence of the ductless glands upon man's vital physiologic processes, and recent studies are making it apparent that the endocrine system in all probability is also the basic factor in shaping and influencing his mental processes and emotions. Thus

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rage and fear, so essential to self-preservation, in the lower animals as well as man, are manifested in physical reactions brought about by an increased discharge from certain of the ductless glands. If, therefore, it may be conceded that self-preservation depends upon the endocrine system, one can even more willingly concede the influence of these glands upon reproduction. Indeed, the earliest knowledge of the ductless glands was the rôle they played in the development of the secondary sex characteristics and their function in reproduction. More than a suspicion now exists that from them originate also the various emotions and mental states accompanying reproduction. It would seem, therefore, that we may, with no stretch of the imagination or violence to reason, concede that the endocrine system is of fundamental importance in the fulfillments of the two great laws of nature and in man is the activating influence in the mental processes growing out of these laws.

In a discussion of any subject bearing upon the ductless glands, certain facts and theories must be kept clearly in mind. Of these the foremost is the fact that there exists normally between the glands a most intimate and well balanced relationship. Abnormal or perverted secretion of one gland means disturbance and necessary readjustment of the others. Theory explains this interrelationship by assuming certain activating and inhibitory influences exerted by one gland over another. Another fact well established is that the action of these glands is produced by the introduction into the circulation of a biochemical substance of the greatest potency. It has further been clearly demonstrated that the same or an allied active principle may be found in two or more glands, which increases the difficulty and adds to the confusion in understanding their individual action. That mental processes may be influenced and determined by the secretion of the ductless glands rests largely on theory, but observation in health and disease has given such clear proof of this in some instances, that it justifies our assuming much more. It is not difficult to believe that human action may be prompted and influenced by a substance in the circulation, if the effect of morphine, atropine, cocaine, alcohol and other drugs is borne in mind. One of the best examples of the effect of the internal secretion on mentality is noted in acromegaly. Early in the disease, during the period of hyperpituitary secretion, the individual becomes alert and keen in all his mental processes, and may exhibit even unusual mental power, but when hypergives way to hyposecretion he quickly becomes dull and stupid. The mental improvement in the cretin under the administration of thyroid also bears upon the subject. Cushing and others have even called attention to certain types of mental derangement which may be due to or largely influenced by perverted glandular secretion. In estimating, however, the effects of internal secretion upon the mind, confusing and conflicting deductions may be drawn, unless one gives proper values to the influence exerted by education, environment, and custom.

By reproduction in mammals, is understood the fertilization and development of the ovum and its expulsion at maturity. In the human species, however, reproduction comprehends much more. It really includes all of the associated factors which lead up to and make possible fertilization. This would recognize in both sexes the influence of the mental and emotional states which accompany the various phases in reproduction and in the female the phenomena of the menstrual cycle. With the exception of love, which is really only the intellectual refinement of ovarian and testicular influence, the emotions associated with reproduction have received scant consideration. The observing student, however, will find plausible explanation in the ductless glands for some of the curious mental states exhibited by women.

The beginning of the reproductive life in both male and female is designated as puberty. Up to this time the male and female are much alike mentally and physically, but with the appearance of secondary sex characteristics the two sexes diverge widely. The male is attracted to the female and his sexual impulses inspire love and passion; physically, he is capable of impregnating. After his reproductive life is once inaugurated, however, it is marked by no physiologic events other than the impregnation of the female. Gradually his reproductive powers wane until he finally becomes impotent at an age varying in different individuals. In the female, puberty is marked by more clear cut physical and mental changes. There is established at this time the reproductive cycle, which continues until the age of forty-five, when her reproductive powers are brought suddenly to a close. During this period of thirty years her life is punctuated by menstruation, pregnancies, child-bearing, and lactation, and finally, with more or less disturbance, she passes through the menopause. A woman's physiologic processes, therefore, after satisfying the requirements for her existence, are for this period manifestly consecrated to reproduction. A woman for thirty years may be regarded as a reproductive machine whose mechanism is in constant action and which only waits to receive the proper stimulus to turn out a finished product. There are marked physical reactions in the various phases of the reproductive cycle, and it is therefore not unreasonable to expect evidence of mental reaction as well.

#### MENSTRUATION

The physical changes in the female at puberty are matters of such common observation that they need not be discussed here. Every thoughtful student, however, asks himself why at the age of fourteen these changes should take place. A plausible basis for the answer is found in the results of experimentation. In young animals removal of the thymus causes precocious sexual development. It has also been shown that removal of the posterior lobe of the pituitary in animals, or disease of this gland in man, results either in failure of the sex characteristics



to appear, or in reversion to the infantile type, depending upon the age of the animal or individual observed. These are undisputed facts which clearly establish the relationship of these glands to each other and the important rôle they play at puberty. It may be assumed that the thymus during the years of childhood exerts an inhibitory influence upon the pituitary. Gradually thymus atrophy takes place, being more or less complete at the age of fourteen. The pituitary being thus released from the restraining influence of the thymus, becomes active and stimulates the ovary. This results in the activation of the interstitial cells, and the consequent development of the secondary sex characteristics. The corpus luteum develops from the Graafian follicle and menstruation and ovulation are now established. Not only does the pituitary initiate these changes, but it is also necessary for the continuance of normal ovarian function. So important is this relationship that the pituitary in large measure is to be regarded as a sex gland. During the past few years it has been established that the corpus luteum also has a distinct secretion. In 1914 Seitz, Wintz and Fingerhut presented a series of studies in which they claimed to have isolated from the corpus luteum two distinct substances, one of which influences the time of menstruation and the other the amount of flow. If their observations are correct, certain types of abnormal menstruation find ready explanation.

The mental states associated with puberty and menstruation are interesting. At puberty the girl acquires quickly the mental attributes of womanhood. There naturally exists in different races and states of civilization a wide range of modification, but in all may be seen the transition of the child mind to the mind of woman. The girl of every race becomes self-conscious, and through the influences of civilization and education this self-consciousness develops into what we term modesty. The tendencies shown by the girl after puberty are also of considerable interest. In some are seen the fondness for out-of-door life and rough sports, while others are indolent and satisfied with a life of inaction. There is good reason to suspect that such tendencies are determined largely by internal secretion, the thyroid probably playing an important part. The mental states during menstruation are often most striking. Frequently there is a tendency to melancholia and impairment of mental efficiency. Such manifestations are so common that they may be regarded as normal. Beyond these normal manifestations there are varying degrees of mental disturbance. The most common of the more pronounced effects is the exhibition of suspicion and unreasonableness, which in certain women may attain the degree that the alienist characterizes as "psychic hysteria." These women at menstruation are utterly unreasonable and illogical. They deliberately construe every act and word into a meaning widely different from that intended. The most trivial and innocent remark of others will be distorted and perverted in such a way as to awaken a sense of injustice and self-pity.

Tears and anger alternate and often physical violence is attempted. Women who ordinarily are sweet tempered and lovable are at these times so entirely changed that they become the feminine prototype of a Dr. Jekyll and Mr. Hyde. One of the curious accompaniments of these states is the physical expression of the mental condition seen in the tendency to work. Women under this influence are restless and will work from early until late at the most strenuous menial labor. Remonstrance from the household calls forth perhaps a flood of angry tears, and only sheer exhaustion will at length compel them to the rest which finally restores them to normal. Results obtained from the experimental study of the action and influence of the adrenals in anger and various forms of physical exertion, would suggest that in the disturbed endocrine balance of these women at menstruation a hyperadrenalin secretion takes place. Another manifestation analogous to the last, but somewhat differently expressed, is seen in those women whose principal symptom is an intense headache, accompanied usually by vomiting. These women are completely incapacitated and each period is anticipated with dread and fear. The condition in some respects bears a close resemblance to a migraine and would indicate some cerebral vasomotor disturbance. The fact that removal of the ovaries cures these patients points to a perverted secretion of the corpus luteum as the probable causal agent.

Beside the disturbances clearly traceable to menstruation it has been well known that all mental conditions and tendencies are much exaggerated during the menstrual period. In the interesting book of Havelock Ellis it is stated that Lombroso found out of eighty women arrested for opposition to the police or for assault all but nine were menstruating at the time. Krugelstein stated that in 107 instances of suicide in women which had come under his observation in all the act was committed at the menstrual period. While so great a number would not be found in every series of suicides in women, in a very large percentage this would be true.

#### PREGNANCY

The physical evidences of glandular activity during pregnancy are most striking and profound. Not only are seen marked changes pertaining directly to the reproductive system but also changes in metabolism. A woman during pregnancy is on the threshold of pathology and it would appear that her border line position might be accounted for by an imperfect readjustment of her endocrine balance. Sajous has argued convincingly for the value of normal adrenal and thyroid secretion in infections and it is not unlikely that the derangement of these glands in pregnancy accounts for the subnormal resistance to infectious diseases shown by pregnant women. Perhaps here we have the explanation for the high death rate among pregnant women during the recent influenza epidemic. The relationship of the

ductless glands to pregnancy is almost an untouched field. It is only in the occasional departure from normal that we are permitted to obtain a glimpse of the wonderful and powerful forces that inaugurate and accomplish those marvelous changes associated with gestation. We stand helpless to explain the complex and subtle influence exerted by these forces, for our knowledge is not yet sufficient to even inspire our imagination to evolve reasonable theories. How shall we explain the breast changes during pregnancy? It surely bespeaks the activation of the mammary glands by some powerful influence, but we can only theorize on the probable source. And what of the enlargement of the thyroid? Is such hypertrophy a compensatory one to furnish a substance to neutralize the increased and unusual toxins elaborated by mother and fetus? There would seem to be much to indicate that this is the case. The influence of the adrenals is seen in the normal and exaggerated pigmentation, but who shall say why or how? Our knowledge of the influence of the pituitary during pregnancy is based upon some real facts, and it is now possible to ascribe to this gland certain manifestations of disturbed metabolism seen during, and following in the wake of pregnancy. The changes in the pituitary itself which take place in pregnant animals are now known to be duplicated in woman. The enlargement of the pituitary which occurs is undoubtedly due to the characteristic pregnancy cells. Just what influence these cells exert is not known. An unusual hypertrophy of the gland so great as to cause pressure upon the optic nerves, accounts for certain instances of total or partial blindness sometimes encountered. The rapid increase in weight so commonly noted in pregnant women indicates a disturbed carbohydrate metabolism of pituitary origin. In this connection Cushing has pointed out that in some of these women may be seen thick lips and a dull expression, accompanied by high sugar tolerance, suggesting acromegaly.

The reason for the onset of labor has been a question that has perplexed the physiologist. There will one day probably be proof that uterine contractions at term are initiated by a liberation of pituitrin through the withdrawal of some inhibiting influence exerted upon the gland during pregnancy. There is even now very good reason to regard the corpus luteum as the source of the inhibiting agent.

When one considers the physical readjustment which takes place during pregnancy and the pleasurable anticipation or dread which such a condition inspires, it is not surprising that every thoughtful woman of normal intelligence should pass through the experience with some mental reaction. Normally every woman is endowed with a love of offspring, but these natural impulses and feelings may be entirely dominated and submerged by social influences. It is unfortunate that environment, conventions of society, and the struggle for existence, should sometimes determine the mental state of pregnant women. Happily, however, the



natural tendencies usually overbalance these artificial influences. Women who in the early weeks of pregnancy are willing to undergo any danger to be rid of pregnancy, as term approaches gradually experience a change of feeling and at delivery are reconciled and happy. We are enchanted by the great mother love displayed by the lower animals. We do not assume that in animals such a protective love is based upon intelligence or reason, so we characterize it as mother instinct. Equally striking is the sudden revulsion of feeling which is observed when the young have reached an age to care for themselves. The mother dog renounces her puppies and snaps at them; the hen, who has expended so much protective care on her chicks, will suddenly drive away the brood which she has so faithfully provided for. Undoubtedly this so-called instinct arises from some secretory influence, probably the pituitary, which for a time prompts the mother love. As the young grow it is provided that the stimulus for mother love be withdrawn and the pituitary relapsing to normal, the animal cares no more for her young and the reproductive cycle is again begun. We have no justification for a belief that the human species is devoid of such an influence. In man's conceit it is pleasant to attribute mother love entirely to the intellect, but unquestionably the impelling force in woman is the same that is found in the lower animals, but one which is glorified by a reasoning intelligence.

Another attribute of the mother that stands out prominently, is courage. The hen is known to be a timorous bird, yet when caring for her brood of little chicks she will exhibit most extraordinary courage in the face of overwhelming dangers. The same is noted in other animals. We cannot attribute this courage to reasoning. It must be the result of some physical stimulus which prompts these animals to this unusual action. Indeed, so strong is this stimulus that often a mother will give her life in the protection of her young. It would seem that the influence which inspires a mother's love may even reverse the natural order of the two fundamental laws and the first great law of nature be relegated to second place.

Bearing upon the mental states of women during pregnancy is a curious manifestation which comes within the scope of pathology. Two years ago the writer described this condition and gave to it the name of "pseudocyesis of hypophyseal dystrophy." It presents a clearcut syndrome and is characterized by rapid increase in weight, perhaps fifty or sixty pounds within a few months. Menstruation either ceases or is much diminished in amount and frequency. The facial expression becomes listless and the woman has little strength and endurance together with the high sugar tolerance that is seen with pituitary derangement. The outstanding feature, however, is the peculiar obsession of pregnancy. These women will cling tenaciously to a belief in pregnancy in the face of expert testimony which ordinarily would convince them. The physician

who questions the diagnosis is a fool and the woman continues her preparation for the labor. At a time which she believes to be term the doctor and nurse are often summoned and it is only when no baby comes that the proof is sufficient to destroy her hope. The underlying condition of glandular disturbance in these patients is usually overlooked and the physician is only consulted concerning the pregnancy. There is much argument in favor of the deranged pituitary activating the mental state of these women. An analogy may be found in the hen who wants to set and who persists in her attempts despite the strenuous and vigorous means used to convince her of her mistake.

#### MENOPAUSE

Every woman looks forward to the change of life with some apprehension. In the physical changes noted at this period can be seen unquestionable endocrine influence. Inasmuch as the same change may be brought about by removal of the ovaries in young women, it is unquestionably the loss of ovarian secretions that accomplishes the physical changes. The question as to whether the ovarian atrophy is a result of some influence emanating from other glands has not been settled. So far as is known today, the ovaries atrophy much as does the thymus at the earlier period of life. On account of the intimate relationship of the ovaries and the other glands of internal secretion, withdrawal of ovarian secretion would naturally result in some disturbance of the other glands. This may be evidenced either in hypo- or hyperactivity. The most common, however, is the hypothyroidism indicated by increase in weight and the tendency to uterine bleeding and in extreme cases the picture of myxedema. The vasomotor effects as shown in the so-called "hot flashes" suggest the adrenals as a participating factor.

The mental states seen during the menopause are well known and are characterized by a tendency to melancholia and even insanities. It is a common observation that women whose mental balance is not secure are especially prone at this period to develop emotional insanity. There can be no question but that in a certain number of instances the mental state is precipitated by the disturbance of the endocrine balance.

Woman has never been understood by man. She is a creature swayed by moods and impulses. She may attain virtues to which no man can aspire or she may sink to depths unfathomed by his imagination. We pay tribute to her virtues and marvel at her iniquities. For ages she has been the theme of poet and philosopher but neither imagination nor wisdom has solved her. Shall we not perhaps find the answer in a better understanding of these subtle influences which determine her physical life? Can we expect the periodic readjustments of so delicate a mechanism operated by such powerful interdependent forces to functionate ever smoothly without some physical or psychical reaction? We

cannot expect to understand woman until we have fathomed these forces that inspire her impulses and dominate her existence. The wave of feminism that swept over the country raised a disquieting fear in the breast of some timid souls that man's place would be usurped by woman. There may appear from time to time an unmarried female who by reason of education and sheer force of will is able to dominate her internal secretions and assume certain prerogatives of man but never until evolution has eliminated her present endocrine glands will woman be other than she always has been. The rôle she plays in life's scheme has too many changes and keeps her too occupied to permit of the mental adaption necessary to a new order of things. Man should therefore view with kindly forbearance the futile effort of woman to overcome by her will the very powers that shape and control her mental processes.

But after all it would really seem that woman is the more important in life's plan. It is woman who activates man to all he does and all he thinks, and is it therefore fitting that we should feel a supremacy? But if we do assume that supremacy we should with all the more reason regard with indulgence those occasional aberrations in the orderly operation of her endocrine system and exclaim in a paraphrase of the well known line

“Woman with all thy glands we love thee still.”

1248 MAIN STREET.

(*For discussion, see p. 378.*)



## DOUBLE FLAP LOW CESAREAN SECTION RESULTS\*

By THURSTON SCOTT WELTON, M.D., F.A.C.S., BROOKLYN, N. Y.

FROM November, 1919, to August, 1920, the author performed the double flap low Cesarean section eleven times. Seven of the eleven patients were potentially infected at the time of operation. With many operators the indications would have justified them to sacrifice the life of the child, and perform craniotomy instead of opening the abdomen.

Although the majority of these women were potentially infected at the time of operation and, although six of the number were infected, according to the temperature charts following the sections, not a single case of peritonitis occurred and the maternal mortality was *nil*.

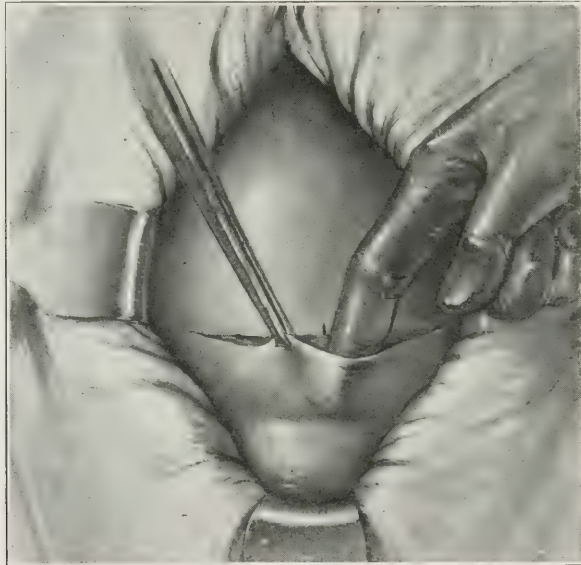


Fig. 1.--Loose peritoneum in region of bladder cut transversely making the lower or inferior peritoneal flap.

It was my privilege to observe Drs. J. O. Polak and A. C. Beck, working at the Long Island College Hospital, operate upon a large number of patients according to the special technic referred to. Their results were so impressive that I began to do this type of operation in cases where Cesarean section was the indication of choice.

Beck described an operation in an article entitled "Observations on a Series of Cases of Cesarean Section Done at the Long Island College

\*Read at the Thirty-third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.

Hospital During the Past Six Years." (American Journal of Obstetrics, Vol. lxxxix, No. 2, 1919), of which the essential features include a low abdominal incision, stripping the bladder with its peritoneal covering from the lower segment of the uterus, dissecting away the peritoneum from the uterus above the bladder incision, incising the uterus in this exposed area, delivering the child, closure of wound in uterus and overlapping the peritoneal flaps so as to seal the uterine wound.

In all my Cesarean cases I have employed the transverse incision of the abdomen just above the pubes. To date the results have been satisfactory. All have healed by primary union. We have observed no hernia

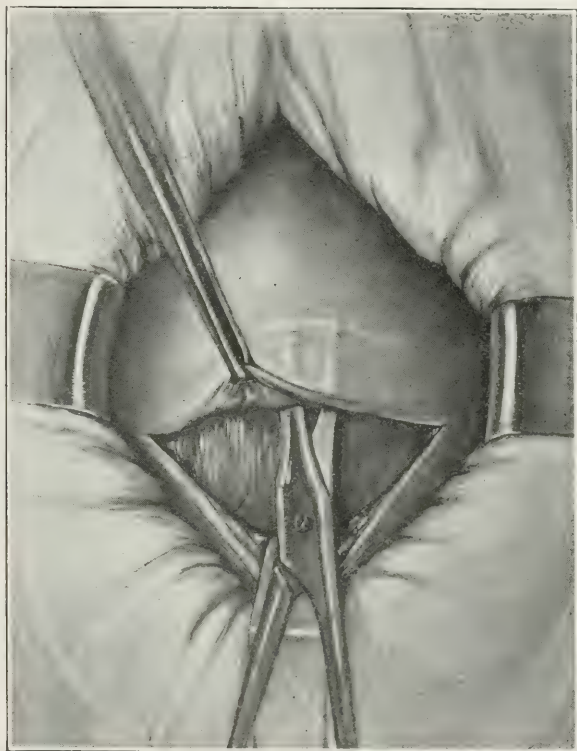


Fig. 2.—Upper or superior peritoneal flap made by dissection with blunt-pointed scissors.

upon discharge from the hospital. I have placed the traction-sutures, one in the lower and one in the upper angle of the uterine incision, prior to opening the uterus. An assistant holds these sutures taut thus facilitating the placing of the first row of deep sutures.

The postoperative treatment consists in a low Fowler position of the bed, an ice-cap to the fundus of the uterus, which is possible only in this type of section as the fundus is above the abdominal dressings, and a dose of pituitrin or ergot. Because of the low situation of the dressings, the fundus of the uterus may be held by a nurse or an assist-

ant to prevent postpartum hemorrhage the same as after a spontaneous delivery.

#### CASE REPORTS\*

CASE 1.—No. 12626. Primipara. In labor three days. Membranes ruptured two days. Family physician made from four to six examinations a day through an unclean vulva. Physician wore no gloves and washed his hands after rather than before the vaginal manipulation. Patient potentially infected at time of operation. Temperature was 100.3°F. on third and fourth day after the operation, and 99.4°F. on fifth day. Infection doubtful. Dismissed from hospital without pelvic pathology.

CASE 2.—No. 12842. Primipara. In labor 32 hours. Membranes ruptured seven hours. No vaginal examinations had been made. Not classified as potentially infected. Patient ran an uneven temperature, 100°F. to 101°F., for seven days which reached the normal the ninth day. Dismissed from hospital with negative findings.

CASE 3.—No. 12877. Primipara. In labor twenty-four hours. Membranes ruptured about ten hours. Three vaginal examinations through prepared field. Potential infection prior to operation doubtful. On fifth day temperature reached 100.2°F. Normal temperature on the sixth day and thereafter. Actual infection doubtful. Negative pelvis on dismissal.

CASE 4.—No. 12950. Para IIP. Ambulance case. In labor thirty-two hours. Membranes ruptured over twenty-four hours. Family physician had examined her "many times" through an unprepared vulva. Had had a previous Cesarean section. Potentially infected at time of operation. Temperature and pulse chart shows actual postoperative infection. Ran an uneven temperature for nine days. On three occasions temperature reached 101°F. with pulse 120. Negative findings upon dismissal from hospital.

CASE 5.—No. 14701. Primipara. Seen by author in consultation. In labor sixteen hours. Membranes ruptured nine hours. Two vaginal examinations through prepared field. Physician wore sterile gloves. Patient was not considered potentially infected at time of the operation. Ran an uneven temperature, between 99°F. and 101°F. for ten days. Diagnosis of infection after operation. Findings were negative upon dismissal from hospital.

CASE 6.—No. 14158. Primipara, forty-two years old. In labor thirty-six hours. Membranes ruptured ten hours. Two vaginal examinations through prepared vulva. Physician wore sterile gloves. Not considered infected at time of operation. On sixth day temperature suddenly reached 100.3°F. and as suddenly returned to normal. No postoperative infection. Negative pelvis upon leaving hospital.

CASE 7.—No. 17138. Primipara. Not in labor. Membranes not ruptured. Many vaginal examinations and attempts at induction of labor by family physician. Ran uneven postoperative temperature, ranging between 100°F. and 103°F. for first eleven days. On the twelfth day temperature reached 104°F., pulse 124. Temperature fell to normal on fourteenth day and after that varied from normal to 99.3°F. until time of dismissal from hospital. Final examination revealed a parametritis.

CASE 8.—No. 17598. Primipara. Patient in labor forty-two hours. Membranes ruptured twenty-four hours. Many vaginal examinations through an unprepared field. Patient potentially infected at time of operation. Uninteresting chart until sixth day, when temperature went to 101.3°F. On eighth day temperature 103°F., and on ninth day 104°F. Uneven temperature until thirteenth day after the operation, when it reached the normal. Patient insisted upon going home on 17th day. Family phy-

\*Cases 1, 2, 3, 4, 5, 6, 10, and 11 are from the Greenpoint Hospital; Cases 7 and 8, from the Williams Hospital; and Case 9, from Long Island College Hospital.



sician instructed regarding treatment. Last report six months later, patient still had symptoms of chronic pelvic infection.

CASE 9.—No. 902. Primipara. Aged forty-two years. In labor twenty-four hours. Membranes ruptured twenty hours. Many vaginal examinations through an unclean vulva. Patient potentially infected at time of operation. Between fourth and tenth days after the operation she ran an uneven temperature between 100°F. and 101.4°F. On dismissal tenderness on both sides of lower abdomen, thickening of

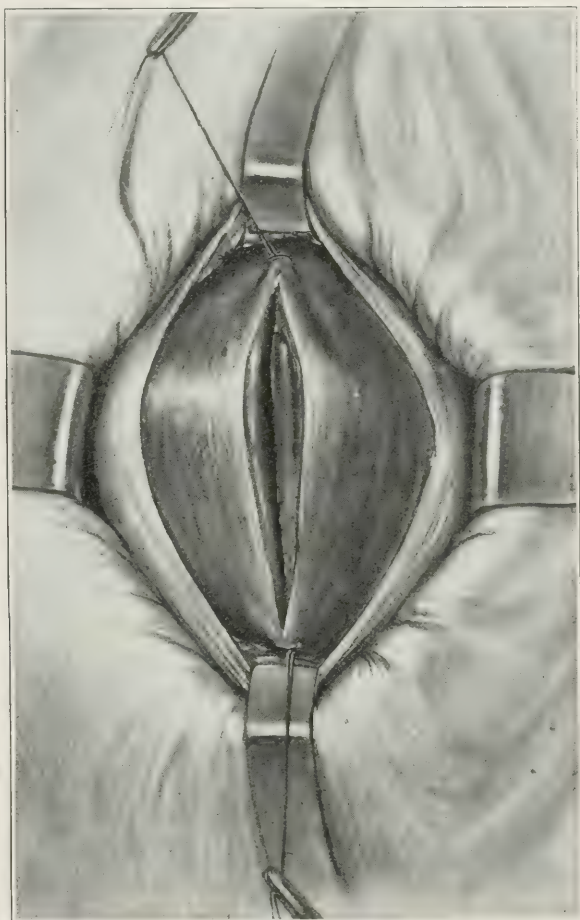


Fig. 3.—Upper and lower peritoneal flaps retracted. Traction sutures inserted in lower and upper angles of site of incision. Incision of uterus between traction sutures.

the bases of both broad ligaments, and tenderness in the uterosacral ligaments. During the third week postpartum, patient developed a phlegmasia alba dolens.

CASE 10.—No. 14518. Multipara. Ambulance case. Not in labor. Membranes intact. Many vaginal examinations by a midwife, later by a physician, through an unclean vulva. Patient potentially infected at time of operation. Temperature reached 99°F. on third day after operation, and continued so until patient left hospital.

CASE 11.—No. 14612. Multipara. Ambulance case. In labor about seventy hours.

Membranes ruptured about fifty hours. Pains severe. Many vaginal examinations through an unprepared field by midwife and physician. Patient potentially infected at time of operation. Temperature normal third day after operation. On night of sixth day temperature 101°F., but it was normal the next morning and remained so until patient left the hospital.

Although seven cases were potentially infected at the time of operation, and six cases showed infection after operation, the uterine wound was so effectually sealed that there was no leak into the general peritoneal cavity and no peritonitis developed. All the mothers lived. Three cases had a distinct pelvic pathology upon dismissal from the hospital.

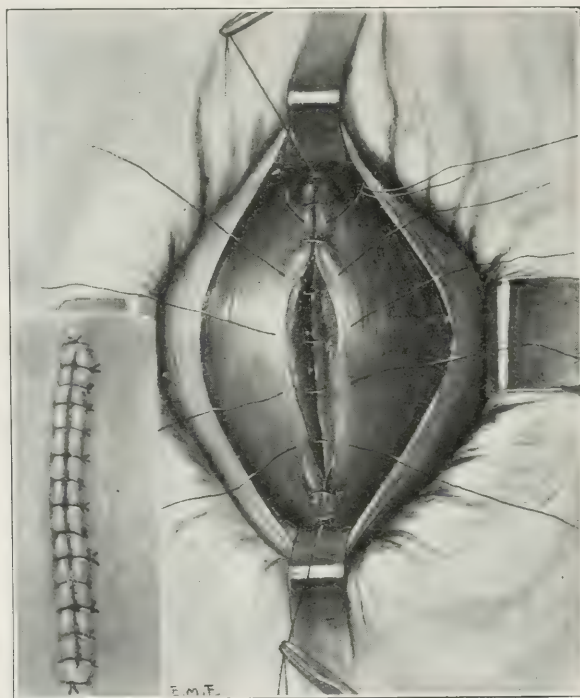


Fig. 4.—Deep layer of interrupted sutures placed. (Placenta and membranes delivered.) Superficial layer of interrupted sutures placed. The placing of these sutures is facilitated by traction made by an assistant. Insert shows uterine wound closed. Sutures tied.

We may sum up these eleven cases as follows:

*Duration of labor before operation:* not in labor, two; in labor 3 to 10 hours, none; in labor 10 to 24 hours, three; in labor 24 to 36 hours, three; in labor 36 to 48 hours, one; in labor more than 48 hours, two; in labor more than 24 hours, six.

*Condition of the membrane:* not ruptured, two; ruptured less than 10 hours, two; ruptured 10 to 24 hours, four; ruptured 24 to 36 hours, one; ruptured 36 to 48 hours, two; ruptured more than 48 hours, none; ruptured more than 10 hours, seven.

*Vaginal examinations:* no vaginal examinations, one; two vaginal ex-

aminations, two; three vaginal examinations, one; many vaginal examinations, seven; two or more vaginal examinations, ten; examinations through an unclean vulva, eight.

Cases which from the duration of the labor, length of time the membranes were ruptured, and the number of vaginal examinations through an unclean vulva were regarded as potentially infected, seven. Of this number those actually infected, as shown by temperature and pulse, six.

Inasmuch as eleven case reports are insufficient from which to draw

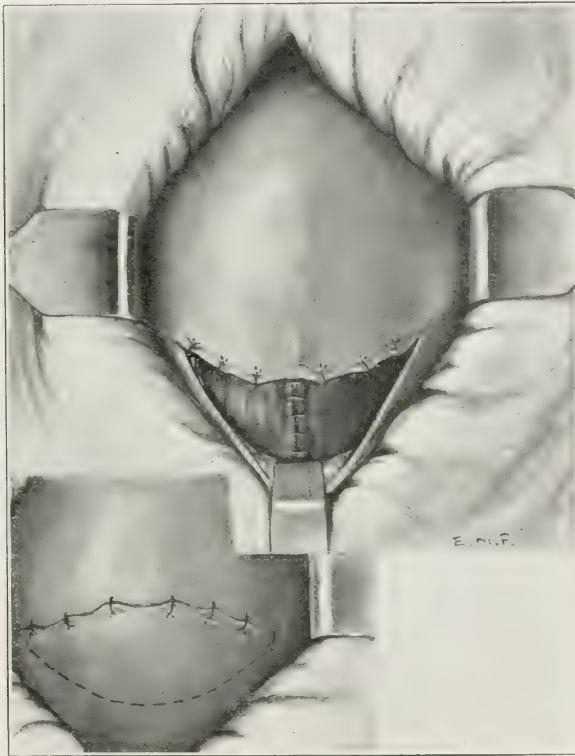


Fig. 5.—Upper picture. The upper or superior flap is anchored by from 4 to 6 interrupted plain catgut sutures. These sutures must not come in contact with the perpendicular uterine wound.

Lower picture. Dotted line shows upper or superior flap anchored. The lower flap of bladder reflection is brought to a point just above the upper angle of the uterine wound and anchored by interrupted plain catgut sutures. A continuous suture may be employed, care being taken not to come in contact with the perpendicular uterine wound. The uterine incision is completely sealed by the peritoneal flaps.

definite conclusions, it is my privilege to add the end results of the cases operated upon by Drs. John Osborn Polak and Alfred C. Beek, from January, 1919, to August 1, 1920, at the Long Island College Hospital. In these nineteen months Polak and Beek performed separately, forty-two double flap low Cesarean sections. Many of these cases were brought to the hospital after having been subjected to much vaginal manipulation by physicians and midwives. In no one instance was the



vulva prepared, neither did the examiner wear sterile gloves. Notwithstanding these facts, in this series of forty-two consecutive cases not a single case of peritonitis developed; and none of the mothers died.

Their chart records, as well as my own, show that the double flaps completely peritonealize the uterine wound. As a result adhesions and postoperative disturbances are greatly minimized. As a result of the findings on this series of a total of 53 cases I have concluded as follows:

1. The double flap and low incision Cesarean section offers great protection against extension of infection to the peritoneum from an infected uterus.

2. For this reason this should be the operation of choice in all potentially infected cases.

3. For the same reason the field for Cesarean section should be extended to such cases as have been long in labor, with the membranes ruptured, and the presence of a potential infection from frequent vaginal manipulation; cases in which most operators would perform a craniotomy on a living child rather than do a Cesarean section.

4. The double flaps so completely peritonealize the uterine wound that adhesions and postoperative disturbances are greatly minimized.

5. Because of the results obtained and the reasons given, the two flap low Cesarean section should be the operation of choice even in elective cases.

842 UNION STREET.

(For discussion, see p. 379.)

## VAGINAL CYSTS\*

BY L. W. STRONG, M.D., NEW YORK, N. Y.

THE clinical importance of vaginal cysts is not extensive, neither are they of extreme rarity; their interest lies chiefly in their origin, for which there are several possibilities.

Traumatism or operative enclosure may result in a cyst without characteristic features. More interesting are heterotopic vestibular or cervical glands which may give rise to cysts of the lower or upper vagina. Apart from such misplacement of the glands it must be noted that the squamosa of the vagina may, through faulty development be replaced by columnar epithelium and this may give rise to glandular structures which may become cystic. Vaginal cysts from such an origin are apt to be small, multiple, with a low columnar epithelium which may be in true papillæ. The most interesting form of cysts, however, is that derived from the Wolffian or Gärtner's duct, and this type may be of considerable size. It is interesting in point of size, in point of complexity of form, and in its predilection site, but apart from these considerations it must be admitted that origin from the Wolffian duct is largely inferential and that there is no determining characteristic.

The wall of a vaginal cyst may contain muscular fibers, but these may be derived from the vaginal musculature and are not peculiar to cysts of Gärtner's duct. The epithelium lining the cyst may be of any type; it frequently happens that the type changes abruptly and even squamous cells may occur in the wall. This indeed is to be regarded as evidence of a heterotopic rather than a mesonephric origin. Vaginal cysts occur rather more frequently on the anterior and lateral walls than on the posterior, which situations give a certain probability to an origin from Gärtner's duct. A review of the course and development of Gärtner's duct is well given by R. Meyer in Lubarsch and Ostertag's "Ergebnissen." Meyer states that the duct normally regresses medially from the epoophoron in the second half of intrauterine life but in embryos of the first month it is demonstrable as uninterrupted. Smaller or larger remnants are found in the newborn, and in 25 per cent of all young children, and they are also not rare in adults. These remnants may give rise to cysts, often with thick walls, most commonly near the uterus. In the adult the epithelium may be strongly papillary and consequently adenomatous growths in the parametrium are to be referred to Gärtner's duct. In the uterus the canal is generally found from the internal os downward, seldom above this. From here on remnants occur down to the hymen.

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\*Read at a meeting of the New York Obstetrical Society, October 12, 1920.

The most important part of Gärtner's duct is the cervical and Meyer regards this as the analogue of the ampulla vasis deferentis, therefore he terms it the ampulla of Gärtner's duct. The ampulla appears in the second fetal month and reaches its highest development in the eighth month. The epithelium is one-layered and highest in the main canal, lowest in the branches. This is an instance of the fact that persisting remnants do not necessarily remain in the stage of differentiation which has been reached, but may develop even further. On this account they have no tendency to tumor formation. Remnants of the duct in the vagina, inclusive of the hymen, were found by Meyer in 94 per cent of feti of two and three months, and in 33 per cent of the newborn. In this situation the epithelium has the greatest individual variations. One-layered, many-layered, high cylindrical or flat epithelium, and numerous transition forms appear in one and the same canal, often abruptly changing from one into the other.

There are three predilection sites in the female; namely, the epophoron, the ampulla and the lowest portion of the vagina inclusive of hymen. Abnormalities in form and course of the duct occur. The epithelium is so variable and individual that one can hardly speak of true abnormalities, and squamous epithelium has even been found in adults. Cysts are the commonest variations from the persisting duct and occur in various sites. Finally adenocarcinoma and adenomyoma may be formed from rests. Thumim described a very characteristic adenoma from dendritic branched canals, so that two forms could be distinguished—namely the main canal and its side branches. Landau and Pick described mesonephritic adenomyomata which Meyer and Fränkel regarded as arising from Gärtner's duct. Carcinoma can develop from adenoma, or a diagnosis of carcinoma might be made from branched Gärtner's duct with many layered epithelium. We see how near normal and abnormal persistence lie to each other, but in fact tumors of the duct are very rare; at the most they are usually cystic.

Two cases seen recently illustrate these two types of vaginal cysts, the large, probably Wolffian and the small probably due to heterotopia of the vaginal squamosa. The first case, Mrs. F., from the service of Dr. G. G. Ward, was sent to the Woman's Hospital with a diagnosis of cystocele. Upon examination a thin-walled cyst, the size of an orange, was found in the lower anterior vaginal wall. This was easily removed and the patient made an uninterrupted recovery. The cyst, received open, had a diameter of approximately 8 cm. The inner surface was smooth, the outer was roughened by hemorrhage. Several sections showed a dense connective tissue without signs of epithelium, others showed a single-layered, high columnar, nonciliated epithelium thrown into marked papillations. The connective tissue beneath the epithelium formed narrow strands which separated distinct bundles of smooth muscle fibers which were very conspicuous. (Fig. 1.) The second case, of which



I have no data except a slide sent for microscopic examination, was a cyst of the anterior vaginal wall just lateral to the cervix. The microscopic examination shows a squamosa interrupted abruptly by a columnar epithelium, in places showing definite papillations. There are occasional glands with simple tubular outline, beneath the surface. The wall consists of a musculature and connective tissue without any characteristic

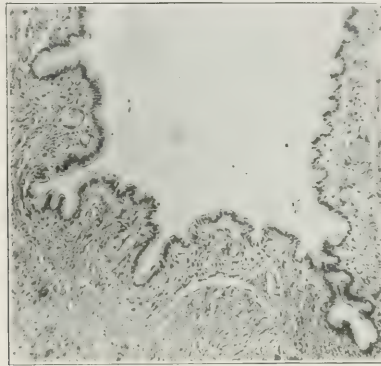


Fig. 1.—Section from large vaginal cyst probably of Wolffian origin.

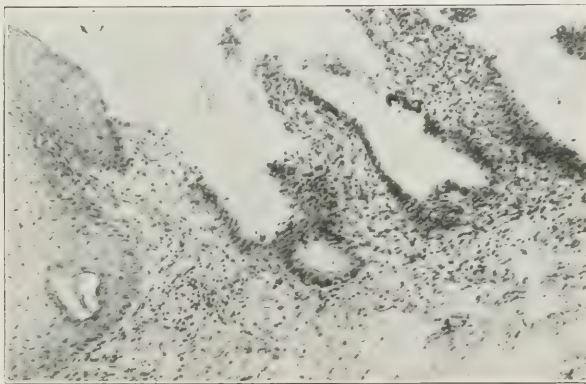


Fig. 2.—Section from cyst of anterior vaginal wall, suggestive of ampulla of Gärtner's duct.

arrangement. (Fig. 2.) Without knowing more as to the size of the cyst, it is impossible to state its origin, though its location strongly suggests the ampulla of Gärtner's duct. The other possibility, that of heterotopia of the squamosa is suggested by the fact that there are alterations of two forms of epithelium. Misplaced cervical glands are less likely, because the epithelium is not the high columnar cervical type, and, as the photograph shows, the villi are not similar to the wavy outline of the collum cervicis.

141 WEST 109TH STREET,

(For discussion, see p. 385.)

## AN ANALYSIS OF FIFTY CASES OF ECTOPIC GESTATION\*

BY HERMANN GRAD, M.D., F.A.C.S., NEW YORK, N. Y.

**I**N a series of fifty cases of ectopic gestation operated on at the Woman's Hospital of New York and elsewhere, certain facts have forced themselves to my attention. These have served as a basis for clinical action and renewed efforts for holding out a helping hand to unfortunate victims of this accident. The facts observed have crystalized themselves in my mind to this end, that ectopic gestation cases clinically divide themselves into four definite groups, according to the degree of the hemorrhage sustained by the patient. These groups are as follows:

1. Ectopic gestation with negligible hemorrhage.
2. Ectopic gestation with moderate hemorrhage.
3. Ectopic gestation with severe hemorrhage.
4. Ectopic gestation with fatal hemorrhage.

In the 50 cases herewith presented, 37 were of the first group, namely, negligible hemorrhage; 4 in the second group, with moderate hemorrhage; 7 in the third group with severe hemorrhage, and 2 were fatal cases from hemorrhage. The analysis of the cases shows that 74 per cent of ectopic gestation have a negligible amount of bleeding; 8 per cent have a moderate amount of bleeding; 14 per cent have severe hemorrhage, and 4 per cent have fatal hemorrhage.

In the first group with 37 cases the most prominent symptom present was pain in 26 cases and uterine bleeding in 11 cases.

I have prepared three tables tabulating the various features of the 50 cases of ectopic gestation. In every one of these cases the pathologist confirmed the diagnosis.

TABLE I  
DIAGNOSIS\*

GROUP	DISEASED ADNEXA	ECTOPIC	FIBROID	APPENDICITIS	RETRO- VERSION	TOTAL	PER CENT
1	23	10	2	1	1	37	25
2	0	2	2	0	0	4	50
3	0	7	0	0	0	7	100
4	0	2	0	0	0	2	100
						50	

\*Ectopic diagnosed incorrectly in 42 per cent of all cases.

Table I deals with the diagnosis. In the first group only 25 per cent were correctly diagnosed; in the second group 50 per cent were diagnosed. In one case of the group a diagnosis of acute appendicitis was

\*Read at a Meeting of the Obstetric Section of the Academy of Medicine, New York, N. Y., October 26, 1920.

made. As I sat at the bedside of this patient the possibility of an ectopic gestation on the right side was duly considered, but was dismissed from my mind. After due deliberation I was so certain of the diagnosis of acute appendicitis that the next day a McBurney incision was made for the removal of the appendix. When the abdomen was opened a ruptured ectopic was encountered with free blood in the peritoneal cavity. The blood was fresh arterial blood and the rupture of the gravid tube must have occurred during the preparation of the patient for the operation. With the patient anesthetized and the protective rigidity of the abdominal muscles removed, the patient is unable to protect herself. It is easily conceived how manipulation of pelvic organs can cause a rupture and consequent bleeding into the peritoneal cavity. Twice I have encountered this condition of fresh arterial blood in the peritoneal cavity from the rupture of the gravid tube during the scrubbing of the patient preliminary to the operation. In both cases the diagnosis of acute appendicitis was made. In the case cited above, where the McBurney incision was made it was impossible to reach the ruptured tube through the incision. Access to the uterine adnexum was, however, obtained by incising the posterior sheath of the rectus muscle.

TABLE II  
SYMPTOMS

GROUP	PAIN	BLEEDING	COLLAPSE	SYNCOPE	TOTAL
1	26	11	0	0	37
2	3	1	0	0	4
3	0	0	7	0	7
4	0	0	0	2	2
Totals	29 58%	12 24%	7 14%	2 4%	50

Table II deals with symptoms. It shows that in the first group pain was the prominent symptom in 26 cases, vaginal bleeding in 11. In the second group pain was a prominent symptom in three and bleeding in one. In the third group the prominent symptom was collapse and in the fourth group syncope. It would seem that there is very little difference between a case with collapse and one with syncope, but actually there is a great difference. In collapse the patient has a thready pulse but her mind is clear. She realizes her condition but her mind is alert and she is conscious of everything. In a case of syncope, the mind is dulled, the patient is not conscious of what goes on about her and the pulse is lost, or at best shows only an occasional beat. I feel that I can hold out hope for a ruptured ectopic case in collapse, but have no hope for one in syncope.

Table III shows the various operations that were performed on 48 cases. In the first group in 16 cases the ectopic was on the right side, in 20 on the left side, and once in the right horn of the uterus. There were 86 operations done. In the second group the gestation was in the right



TABLE III  
OPERATION

GROUP	SALPINGECTOMY		HORN	D & C	MYO- MECTOMY	PLASTIC	APPEN- DECTOMY	OVARY	TOTAL
	Right	Left	Right						
1	16	20	1	17	1	3	16	12	86
2	1	3	0	1	0	0	1	1	7
			Left						
3	5	1	1	0	0		0	2	9
4	22	24	2	18	1	3	17	15	102
	44%	48%							

side in one case, and three times on the left. In 48 cases the right tube was involved twenty-two times and the left tube twenty-four times, showing that the gestation occurs with the same frequency in both Fallopian tubes. In two cases the pregnancy was interstitial, once on the right and once on the left side.

Cases in the first group frequently escape diagnosis. The patients are not very sick and I have no doubt many of them recover spontaneously without any incident. If the diagnosis is established, it is done so on physical findings. Operation in these cases should be performed, because the patient may suffer a severe hemorrhage from a repeated rupture of the tube. Operation can be deferred until the peritoneal irritation subsides and recovery takes place from the attack of pain. Operations under these conditions have no mortality and very little morbidity.

There should be no difficulty in diagnosing the second group of cases. The hemorrhage is of a moderate degree as is also the shock; the pulse is good, the pain quite severe, and yet only 50 per cent are diagnosed correctly. Local examination is not always necessary to establish the diagnosis and should, if possible, be avoided. In the four cases under this group, three had pain and one bleeding from uterus. In these cases also operation should be deferred until the patient recovers from the shock and of the hemorrhage. The operation, however, should not be delayed long on account of the danger of repeated hemorrhage. In this class of cases the operation in the interval gives practically no mortality and very little morbidity. The patient should be in the hospital in bed and under suspension of all activity.

The problem is different with the third group. These are cases where the hemorrhage has been very severe, the shock very marked and collapse is imminent. These cases require immediate treatment before they are even transported to the hospital. Local manipulation of every kind should be avoided. All efforts should be directed towards supporting the vital function of the patient until the bleeding can be controlled by operative measures. The pain should be relieved by morphine, the head lowered, the extremities bandaged. As soon as arrangements can be made the case should be sent to the hospital for operation. A donor should be at hand for a blood transfusion which is started before the

abdominal incision is made. The transfusion of blood is continued during operation and ended after the abdomen is closed.

Gentle manipulation during the preparation for operation is very essential. The vagina should not be washed. Vaginal examination should be avoided. While the patient is being prepared for operation and while the necessary blood tests are being made of the donor a hypodermoclysis of salt solution may be given under the breast.

When the donor is ready and everything is prepared for the operation, the patient is sent to the operating room, but the anesthesia should not be started until about 200 c.c. of blood have been transfused. These exsanguinated cases are very readily anesthetized, a few whiffs of gas cause enough anesthesia to allow the abdominal incision to be made and to tie off the tube so as to control further bleeding. The operation should be of short duration. The damaged tube should be excised by a technic that can be executed with expedition and safety. It is not necessary to clean up the peritoneal cavity, only those clots that can be readily removed need be sponged out. Fluid blood is removed merely to allow the operator to see the operative field. If the case proves to be an interstitial pregnancy with a ragged uterine horn, the tissues in the ragged hole are rapidly cleared away, all products of the gestation removed, if necessary, fragments of tissue are trimmed with scissors, and the aperture in the horn of the uterus closed with interrupted sutures, care being taken to suture firmly enough to insure against further bleeding. The suture line in the horn of the uterus should be peritonealized if this can be accomplished without prolonging the operation too much. This method of closure of the ragged hole in the horn of the uterus, no matter how great the damage may be in the organ, is preferable to a hysterectomy, as the recovery is much smoother. In two cases of this series, hysterectomy was performed. In both the convalescence was very stormy, and they were on the verge of death for several days. Pathologic tissue should be removed as expeditiously as possible. If the opposite tube of the ruptured side is diseased it should be removed but no extensive dissection of tissue should be undertaken. A pus tube on the opposite side is often encountered. A rapid salpingectomy can always be done without any danger to the patient. The abdomen is closed as quickly as possible and the patient returned to her bed for further treatment.

Can anything be done for the fourth group of cases with our modern methods and better equipment? I believe today we can rescue some of these possibly fatal cases by well-directed and concerted action. How shall we go about it? These fatal cases of ruptured ectopic when found in a state of syncope bear very poorly transportation to the nearest hospital. If these cases are to be saved, something must be done for them at their homes. It is therefore essential that hospitals provide the necessary things needed to rescue life.

Called to a case of ruptured ectopic with syncope our first thought

must be to restore the circulation to a degree compatible with life. Experience has shown that normal saline solution given intravenously is not sufficient to maintain life because the solution does not remain in the circulation. Modern investigations have shown that by adding gum arabic to a saline solution the fluid will remain in the blood vessels for a longer time than a solution without gum. If this is true it will offer a life-saving measure in these serious cases of ectopic gestation. At the Woman's Hospital we have been using a gum glucose solution with very good results. I have had no experience with this gum glucose solution in what I consider fatal cases of ruptured ectopic gestation, but if gum glucose will stay in the blood vessels for a sufficient time, until a donor can be obtained for a blood transfusion then I feel that it will prove a life-saving measure. It is worthy of trial.

Should I come in contact with a case of ruptured ectopic with symptoms of syncope added to that of collapse and shock, I would suggest the following procedure. As these cases bear a transportation poorly, usually dying 15 or 20 minutes after they reach the hospital, they should be infused with gum glucose or saline and gum solution before transportation. While this is being done a donor should be obtained for a blood transfusion. While the preparation is being made for the gum infusion the patient must be relieved of pain with morphine, the extremities should be bandaged, the foot of the bed elevated, and external heat applied to diminish radiation. Cardiac stimulants should not be used, as a possible displacement of a clot formed in the bleeding vessels is to be discouraged.

With the donor at hand and the pulse restored even partially with the gum solution, the patient may now bear transfer to the operating room, where the blood transfusion may be given at once. After several hundred c.c. of blood have been given, the anesthesia is started. Deep narcosis is to be avoided. The operation should be done as rapidly as possible and should have for its aim the control of the bleeding and nothing else. It is not necessary to prolong the operation in order to remove fluid blood and clots. The blood transfusion is continued during the operation and ended with the closure of the abdomen. A large quantity of transfused blood is not essential, from 500 to 600 c.c. is sufficient. In this manner I believe some of these fatal cases may be rescued from death, at any rate it is worth trying.

In the two fatal cases that came under my observation the histories were as follows:

Mrs. E., age thirty had missed one menstrual period, and began to spot a few days before the time of her second period. She considered herself pregnant. She had one child 2 years previously. About 10 A.M. the patient experienced abdominal pain, went to the bathroom, and fainted. She was put to bed and felt better. At 11:30 she had a severe attack of abdominal pain and sent for her doctor. He arrived at 3 P.M. and found the patient in collapse. I saw the patient about 4 P.M. and she was admitted to the hospital about 4:30 where she died about 40 minutes after



admission when an intravenous transfusion was begun. The patient died about seven hours after the initial onset of the pain. How long she was in the state of collapse and how long the state of syncope lasted is not definitely known, but so far as could be learned the patient went into collapse about 2 P.M.

In the second fatal case the history was somewhat different. This patient was a young woman nineteen years old, married eight months. She had missed two periods and had her bleeding and spotting for six weeks. She consulted a physician who was to have curetted her for retained secundines. The day previous to the expected operation for curettage the patient was seized with a very sharp attack of pain, and also fainted in the bathroom. This occurred about 9 A.M. Her physician did not see her until 4 P.M. when he found her in collapse. I saw the patient about 6:45 in complete collapse with attacks of syncope following each other in rapid succession. She arrived at the hospital at 7:30 P.M. The donor was at hand at 8:10. The patient received about 300 c.c. of blood when she expired. No operation could be performed.

40 EAST FORTY-FIRST STREET.

(*For discussion, see p. 394.*)

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### Erratum

Issue of December, 1920. Article of Dr. R. T. LaVake on Toxic Vomiting of Early Pregnancy, page 289. Employment of corpus luteum extract inadvertently attributed to Dr. B. C. Hirst should read Dr. J. C. Hirst.

## Case Reports

### HERNIA OF THE ILEUM THROUGH A RENT IN THE MESENTERY\*

By WM. EDGAR DARNALL, M.D., F.A.C.S., ATLANTIC CITY, N. J.

THE occurrence of the hernia described below is very unusual. I can recall but one case reported in medical literature similar to this one. The author's name I have forgotten. F. A. Roscher, Christiana, Norway, however, reported a case of "Reposition *en bloc* with Ileus," in 1919, in which there was a condition somewhat akin to that in my patient.

Mrs. D. Age, forty-six, married, weight 200 lbs., one child. She has never been seriously ill; family history negative. She was the picture of health. Has had no symptoms until recently when she noticed a "lump" in the abdomen and suffered from menorrhagia.

Examination revealed a fibroid tumor of considerable size, freely movable and uncomplicated; there was also a very slight laceration of the cervix. On July 12, 1918, I performed a supravaginal hysterectomy. From this operation she made a most perfect recovery.

On August 12th, a month afterwards, she ate a large dinner. About six o'clock the next morning she was seized with vomiting and a most agonizing pain in the epigastrium. The pain was so severe that morphine had to be administered. Irrigation of the bowel produced a copious stool. The next day her pains were considerably improved but distention appeared. During the afternoon there was an absence of peristaltic sounds on auscultation, the pulse was increased in rapidity, and the temperature had risen to 101° F. Dr. Hobart A. Hare, of Philadelphia, saw the patient with me in consultation and was of the opinion that, in spite of the temperature, there was some form of obstruction, although enemata still brought away some feces and gas. Operation was decided upon and performed at 5 P. M. The findings were as follows: Through an opening in the mesentery of the second convolution of the ileum there had slipped a loop of the ileum belonging to the first convolution high up on the left side under the spleen. There was a volvulus of this loop, and it was gangrenous and perforated. There was an abscess in the left kidney pouch and foci of pus at various locations in the upper abdomen. The whole abdominal cavity was filled with fluid and intestinal contents.

The hernia was released and the rent in the mesentery closed. Twelve inches of ileum were resected and a Murphy button used for anastomosis. Drainage and counterdrainage were used. Proctocolysis with Locke-Ringer solution was instituted and the Fowler position ordered.

An opportunity was afforded of inspecting the lower abdomen and pelvis which were found in perfect condition with no adhesions or constricting bands anywhere. Indeed it was rather exceptional to find everything so smooth and free from adhesions just one month after the first operation.

\*Read at the Thirty-third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.

I am unable to account for the rent in the mesentery so far from the site of the pelvic operation, which made this unusual hernia possible. The patient had led a very quiet and well-ordered life since her first operation and was apparently in perfect health. Death occurred from shock about five hours after the operation.

1704 PACIFIC AVENUE.

(For discussion, see p. 381.)

## AN UNUSUAL ABDOMINAL CYST\*

BY O. G. PFAFF, M.D., INDIANAPOLIS, IND.

**T**HIS case is reported on account of its rarity and the puzzling diagnostic elements which it presents; consequently attention is directed almost solely to certain mechanical features which are here briefly described.

On March 20, 1920, I was consulted by a young married woman on account of a large abdominal cyst which had been tapped ten days previously; twelve quarts of thin fluid having been drawn off at that time, according to the statements of the patient and her husband. Her history had been one of good health. The first menstruation occurred at the age of fourteen and this function had always been normal. She had passed through three normal pregnancies, the last of which occurred three years ago, and was followed by phlebitis affecting both legs. This had, however, practically disappeared when I first saw her.

She noticed some abdominal swelling about four months before she came to me. This had not given her very much trouble until about six weeks before she consulted me, when she began to suffer severely from pressure symptoms. Her appetite was impaired and she had lost a few pounds in weight.

The abdomen was greatly distended, and fluctuation was readily elicited in every part. Dullness on percussion was general with the exception of a slight indistinct resonance in the epigastrium.

The case was considered one of large ovarian cyst. She came into the hospital, March 22, and I operated the following day.

Through the usual median incision I came directly upon the sac, which was so densely adherent to the parietal peritoneum that it required some care to develop a line of cleavage; the further separation, however, being accomplished with only moderate difficulty and I was then able to pass my hand freely in every direction, widely on either side and almost from the diaphragm to the pelvic brim. Retracting the lower angle of the abdominal incision the bladder came into view; it was normal in appearance and free from adhesions. Its wholesome color contrasted strongly with the dark, purplish red hue of the cyst wall, which was firmly adherent across the brim of the pelvis in front of the uterus and on a line corresponding to the vesicouterine fold. Upon separating the sac along this line a gush of several quarts of water occurred. I continued the separation and lifted up a flap of the material seemingly constituting the anterior wall of the cyst, but which was now recognized as a perverted and greatly thickened omentum. With the lower omental flap held up, I came upon a number of peritoneal cysts varying in size from that of a walnut to a large grape fruit. The whole pelvis was filled with this mass. The intestines were held down and away from the anterior abdominal wall by innumerable strands of adhesions so that, even when distended by gas, there would be no note of tympany elicited on percussion. This was one of the puzzling elements in diagnosis. The laboratory report on the specimen removed for examination stated that the condition was a proliferating tuberculosis with much newly formed fibrous tissue.

\*Presented at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.



Merry describes certain rare forms of tuberculous peritonitis which manifest themselves as large tumors which, on account of their abnormal situation, present very confusing features leading to a variety of diagnostic errors. He reports a number of cases. Numerous cases are also recorded of tuberculous cysts which present clinical pictures and physical resemblances to pyosalpinx.

The only report which I have been able to find of a case somewhat similar to the one I have related was by A. J. Nyulasy in the *Australasian Gazette*. The patient was a healthy looking girl of seventeen years, with a greatly enlarged abdomen and long standing pain in the iliac fossa. Examination showed dullness extending upwards towards the umbilicus in the midline and to the right of it; but higher on the left side, the dull area being rather indefinitely fluctuant. When the abdomen was opened, the omentum was found adherent to the abdominal wall, greatly thickened and caused the anterior wall to resemble a fluctuating cyst. Along with the thickened peritoneum was a layer of fibrinous material which largely formed the front and sides of the cyst wall and spreading below completely hid from view the uterus and appendages. Posteriorly the cyst wall was formed by the intestines.

The case which I report is unique in my experience. The great thickening of the omentum, the extensive fibrinous formation, the restrained viscera, all were unusual; and the resultant absence of tympany regardless of posture constituted a complex which was very puzzling, indeed, and very misleading in diagnosis.

2222 NORTH PENNSYLVANIA STREET.

## 1. ENCEPHALITIS COMPLICATING PREGNANCY NEAR TERM.

### 2. MALIGNANT DISEASE OF THE CERVIX IN A YOUNG PRIMIPARA\*

BY WILLIAM M. BROWN, M.D., F.A.C.S., ROCHESTER, N. Y.

CASE 1.—Encephalitis complicating pregnancy near term presents unusual difficulties of diagnosis. Mrs. V. S., American born, white, aged thirty-one, married six years and pregnant for the first time. Family history negative. She had had no serious illness, except the ordinary diseases of childhood. For several years she was subject to irregular and severe headaches. Menstrual life began at thirteen and was always regular and normal. The last period occurred July 24, 1919. The date of quickening was not noted, but labor was anticipated about April 30, 1920. There was very little vomiting during the early months of gestation, but on September 30 she had a very severe headache, both frontal and occipital. This headache recurred at irregular intervals during her pregnancy. In February, 1920, her eyes and nose were examined and reported normal. Bowels moved freely at all times. There was no edema. Frequent urine examinations showed normal renal function. The following month she called on her physician complaining of headache and a blurred vision; the systolic blood pressure was 126. She was sent to a hospital and placed on pre-eclamptic treatment, low protein and salt-free diet, and sulphate of magnesia to full catharsis. When admitted to the hospital, her temperature was 97°F., pulse 110, respiration 22, and blood pressure 118/77. On March 30, she still complained of dim vision and the ophthalmologic report was as follows: Pupillary reactions normal; tension of both eyes normal; counts fingers with either eye at four feet; there is a moderate retinitis. White areas not fully developed, and some exudate

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around the disk; vessels are hyperemic. The oculist's comment was "I doubt if patient can go to full term without permanently impairing her vision."

For the substance of the above history I am indebted to Dr. L. L. Button who asked me to see the case with him on the afternoon of March 30. During the two previous days her temperature fluctuated between 98.6° and 100° F. The blood pressure was 118/80.

After a careful examination of the patient and history, I was not convinced that it was an uncomplicated case of toxemia of pregnancy and advised further observation; but the other physicians and the relatives were so fearful of eclampsia and so convinced that her illness was due alone to her pregnant condition that I was persuaded to undertake immediate delivery because I could offer no satisfactory objection.

Abdominal delivery was elected as being the safest procedure for both mother and child. The operative record shows a preoperative diagnosis of "toxemia of pregnancy," with a reservation. A classical Cesarean section was performed through the supraumbilical incision. After delivery of the uterine contents and repair of the uterine wound, seven small-sized subserous fibroids were removed from the fundus. Before beginning the operation, a stomach tube was passed to relieve an extreme gastric dilatation.

The patient reacted well from the operation, but twenty-four hours later her temperature was 101° F., and thirty-six hours thereafter it had risen to 103° F. It then gradually receded until on the seventh day postpartum it touched normal; but immediately rose again to 103° F. where it remained most of the time for about five days, when it became normal again and remained so for three days. During her entire illness a most embarrassing and obstinate abdominal distention was present. On April 11 a few crepitant râles were heard at the base of the right lung and on the fifteenth there was dullness and a small area of bronchial breathing. At this time I retired from the case and her own physician resumed her care.

On April 25, I was again called to see this patient. She had steadily improved and had been up in a wheel chair the day before. But on that very evening she had a severe convulsion of five minutes' duration. Her blood pressure was 130/80.

Patient complained of severe pain and tenderness in the left upper abdomen and back. There was marked rigidity of muscles of left side of the abdomen. April 27, there was increased stupor, marked Babinski sign in the left foot, and the left leg was flexed constantly. April 28, two convulsions. April 29, considerable pulmonary edema. Babinski sign present in both feet; pupils normal and react to light equally; can swallow well. April 28, a spinal tap was made. Pressure 60 mm. Globulin positive, two cells per mm. Bacteria none. A cystoscopy and ureteral catheterization showed normal condition of bladder and ureters. During this time the temperature ranged between 102° and 103°; the pulse between 120 and 130, and the respiration between 30 and 40. The blood contained 83 per cent polynuclear cells, and the gross white count ranged from 7840 to 16896. The blood urea nitrogen always remained about ten mgm. per 100 c.c.

April 27, a rapid abdominal exploration was made to decide the question of peritonitis. No pathology was found. Considerable rigidity of the neck was noticed at this time. The ophthalmologist again examined the eyes, under a mydriatic, and stated positively that the coma was not due to brain pressure. April 28, I was present during one of the convulsions and noticed that the seizure began in the index and middle fingers of the left hand and then gradually involved all other muscles of the body. I now abandoned every other diagnosis except encephalitis and gave a fatal prognosis. She died the following day. The post-mortem findings were as follows: Body length 65 inches; well developed and nourished. Rigor mortis in extremities. Surgical incision of abdomen undergoing normal healing. Pleural cavity; small filiform adhesions present in both sides.

A small amount of fluid in both cavities. Pericardial cavity, about 60 c.c. of clear fluid except over the sac. Visceral surfaces smooth and normal. Abdominal cavity, peritoneal surfaces smooth and normal, except over the fundus of the uterus a few adhesions bind the healing uterus to the wall of the intestine. Lungs crepitant throughout, except in the right lower lobe where there was a partly consolidated condition. Section shows pneumonic areas. Heart and vessels; heart weighs 250 grams. Valves and myocardium normal. Aorta normal. Liver, weight, approximately 1200 grams. Liver tissue is slightly pale in color but otherwise normal. Gall bladder, normal. Pancreas; weight, 75 grams. Normal. Spleen; weight, 90 grams. Pulp cream-red in color. Kidneys; combined weight 250 grams. Cortex and medulla easily distinguished from one another. The parenchyma congested and blue-red in color. The capsules strip normally. Subcapsular cortical tissue injected. Stomach and intestines hyperemic, but in other respects normal. Uterus; endometrium smooth and of a pink-red color. The wall of the fundus partly (about half) repaired; the peritoneal surface below normal. Head; scalp covered with serum, due to a wet and boggy skin. The surface of the calvarium is wet and slippery (serous). Beneath the dura mater a thick purulent exudate covered the superior surfaces of the right and left hemispheres. Section into the brain substance showed the lateral ventricles contain a small quantity of slightly reddened fluid. The cortical and subcortical brain tissue presented petechial hemorrhages. In the right cerebral hemisphere was an area 2x3 inches in diameter composed of blood clot bordered by softened brain tissue. The hemorrhage did not communicate with the ventricles of the brain. The meninges of the base of the brain were not involved. Bacteriologic examination; diplococcus and pneumococcus from cerebral hemisphere. Anatomic diagnosis: Encephalitis. Brain hemorrhage. Basal lobar pneumonia. Parenchymatous nephritis. Postoperative healing wounds of uterus and abdominal wall.

CASE 2.—Malignant disease of the cervix in a young primipara. This case is presented because of its extreme rarity, and its history should be preserved in the records of this association.

Mrs. H. G., aged twenty-four years, American, white. Father died at forty-seven of heart trouble; mother died at forty-one of cancer of the stomach. Otherwise hereditary history negative. Before puberty patient had scarlet fever, mumps, measles, whooping cough, and chicken pox. At eighteen she suffered an attack of appendicitis, but was not operated upon. Menstruation began in the twelfth year and was always regular, the flow being moderate and without pain. About a year ago she missed one period, believed herself pregnant, and thought she miscarried. No cause was known for the menstrual omission or the abortion, if it was one. There was no instrumentation of any kind. With the exception of June, 1919, she menstruated regularly throughout her pregnancy, each period lasting about four days. She was admitted to the hospital service on January 14, 1920, with a message from her physician that she had placenta previa.

Examination showed the patient to be organically and physiologically normal, except for a foul, grumous, red, vaginal discharge. Pregnant and near term. Vertex presented. Rectal examination revealed a soft spongy mass in the region of the cervix. January 16, after careful preparation, and under gas anesthesia, an ocular examination of the vagina was made and a soft sloughing mass was observed which involved the right side of the cervix and the upper portion of the vagina. The cervix was quite movable and not dilated. A small section of the mass was removed with the sponge forceps, which the pathologist pronounced "highly malignant, rapidly advancing squamous-celled carcinoma."

The membranes ruptured and labor began the morning of January 20. She was immediately taken to the operating room, and a transperitoneal Cesarean section was performed through a low and long incision. A healthy child was delivered. The



uterus was quickly closed with temporary sutures. This was immediately followed by a panhysterectomy, removing the upper half of the vagina at the same time. There was a minimum of hemorrhage. No shock followed the procedure. The operation was completed in a little less than thirty minutes. Recovery was prompt and uneventful. A vaginal examination, made on February 4, showed a few small nodules in the vault of the amputated vagina. A more radical operation was suggested, but was declined for the time. She left the hospital February 5, promising to return in a week. This she did not do; but instead she returned April 6, when I found the whole upper part of the vagina involved by the bleeding malignant mass. She was not seen again. Her death was announced August 21. The youth of this patient, and the extreme rapidity with which the malignant growth spread in a patient who had never had an injury to the parts involved, make this case one of great interest.

1776 EAST AVENUE.

## RUPTURE OF THE BLADDER DURING LABOR\*

BY JOHN WILSON POUCHER, M.D., POUGHKEEPSIE, N. Y.

**B**ECAUSE the attending physician could not be located, I was called, about 8 P. M., to the maternity ward of the hospital to see Mrs. W., a primipara, twenty-four years of age. The patient had been in labor about six hours. Her nurse, an experienced one, informed me, that the labor pains had been almost constant for the past hour, and had remained so until a few minutes before my arrival, when, after a very severe paroxysm, they had stopped suddenly. Almost immediately after the cessation of labor pains, the nurse noticed that the patient's respiration had become labored, the pulse had become rapid and weak, and that there was every indication of impending collapse.

The following was the condition on my arrival: Thin, rapid pulse; labored breathing; general exhaustion; anxious expression of the face; body and extremities covered with cold perspiration. An examination showed the fetal head low down, almost upon the perineum.

As there had been no labor pains for the last half hour or more, and taking into consideration the marked condition of shock, a diagnosis of ruptured uterus was made, and as the patient was beginning to respond to stimulants, which had been administered, I decided to deliver at once. This was easily accomplished with the forceps under light chloroform anesthesia; and, rather to my surprise, the uterus contracted normally, and expelled the placenta promptly.

The mother rallied rapidly after labor was completed, and I left her feeling very comfortable; indeed, she passed a very comfortable night. The next morning she began to complain of some discomfort, and her nurse discovered that there was considerable abdominal distention. Upon palpating the abdomen, I found that the distention was caused by fluid, and was too extensive to be caused by a full bladder alone.

As the patient had not voided urine since her delivery, and had experienced no desire to do so, the bladder was catheterized, with the result that a large quantity, about four pints, of slightly bloody urine was withdrawn and, at the same time, the abdominal distention disappeared almost entirely.

The patient was at once prepared for operation, and taken to the operating room. A median laparotomy disclosed a transverse laceration of the bladder, about two and one half inches long, extending across the fundus of the organ. The tear was care-

\*Presented at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.

fully closed with two chromic cat gut sutures. The abdominal and pelvic cavities were then gently sponged dry of a considerable quantity of urine, and the abdomen closed, with a drainage tube left *in situ*. This was removed the third day. The bladder was drained for the first 24 hours by a retention catheter; but as this was a source of discomfort, it was removed and the bladder was catheterized every two hours for the next two days.

Patient showed not the slightest ill effects from her operation, and was discharged well on the twentieth day after labor.

I find that rupture of the bladder under such conditions is very rare, and that it usually occurs after long, protracted labors, or that it is the result of injury due to instrumental delivery. It is then usually discovered later in the form of uterovesical or vesicovaginal fistula.

The accident could not have occurred in this case had there not been a distended bladder. Although the patient was said to have voided urine frequently during her labor, she evidently had not emptied her bladder. As the head descended and the bladder became more and more distended it was crowded up above the pubes.

It is self-evident that the operation for a ruptured bladder should be done at the earliest possible moment. In this case, about twelve hours had elapsed with no bad results. The peritoneum appears to have suffered no harm from the large quantity of normal, sterile urine. There was practically no hemorrhage, although the tear in the bladder wall was quite extensive.

Because of the possibility of infection, I did not disturb a very small, harmless, but normal looking appendix, although it was very much in evidence.

A little more than a year afterward, I had occasion to operate on this patient for a large gangrenous appendix, with extensive adhesions. I mention this because I believe that this condition of the appendix is likely to occur after such a disturbance in the peritoneal cavity. I have observed this once after a gunshot wound of the abdomen, where several loops of intestine had been perforated, and where there was considerable hemorrhage from injury to mesenteric vessels. On two other occasions I observed this condition while operating for ruptured ectopic gestation.

339 MILL STREET.

## 1. ACCIDENTAL HEMORRHAGE. CESAREAN SECTION.

### 2. HEMATURIA IN PREGNANCY\*

BY JAMES K. QUIGLEY, M.D., ROCHESTER, N. Y.

**C**ASE 1.—Accidental hemorrhage. Cesarean section. Mrs. E. J., aged thirty-three, para VI, native of New York State. Hospital No. 5429.

*Personal History.*—In infancy and childhood she had measles, mumps, chicken pox and acute catarrhal jaundice. In adult life she had influenza and pneumonia. *Menstrual History:* Began at 14; always regular; duration five days; flow scant; moderate pain during first day. Last menstruation occurred March 15 and was quite profuse. Estimated date of confinement, December 22. *Previous pregnancies,* considerable headache and edema of the feet. *Present pregnancy* has had the same symptoms plus disturbance in vision. The five *previous labors* were normal, and spontaneous. She had four miscarriages, cause not known.

*Present History.*—This patient on the day previous to her admission to the hospital fell to the floor, striking her head. She does not remember having struck any other portion of her body. She apparently went into labor at seven o'clock the fol-

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Atlantic City, N. J., September 20-22, 1920.

lowing morning, having some flow. She sent for her physician who, upon his arrival, found her bleeding profusely and, therefore, sent her to the hospital in an ambulance where she arrived about 1:40 P. M.

*Examination.*—Patient is of moderate height and weight, very pale, no air hunger manifest. Pulse 124, poor in quality, systolic murmur over base of the heart not transmitted. *Abdomen:* Uterus size of nine months' pregnancy, very tense and board-like, uniformly tender. Palpation of fetal parts impossible. Fetal heart inaudible. Rectal examination disclosed an elongated undilated cervix. Presenting part high. A diagnosis of accidental hemorrhage of the combined type was made. *Blood Examination:* Red cells 3,380,000; white cells 16,600; hemoglobin 80 per cent (Tallquist). Blood pressure 174/132. *Urinalysis:* Sp. gr., 1,020; amber in color; acid reaction; albumin present; no glucose.

The bleeding had almost ceased and the patient began to rally some, though there was no change in the abdominal signs. She was given 1,000 c.c. of saline solution intravenously, later 400 c.c. of blood was transfused from her husband. Forty minutes after the completion of the transfusion she was taken to the operating room. Abdominal delivery was decided upon, not in the interests of the child which had evidently perished, but because it offered the patient the best chance of life.

*Operation.*—Preoperative preparation was done on the table. Anesthetic: nitrous oxide with a small amount of ether. The pulse at the beginning of the operation was 150. An incision four inches long, with its center opposite the umbilicus, was made slightly to the left of the median line. One c.c. pituitrin given. The uterus, when exposed, was found large and very tense, of a mottled purplish color, and ecchymotic in appearance. The peritoneal cavity contained from one and one-half to two pints of sero-sanguinous fluid. Cutting the uterine muscle it looked almost normal in color, showed no areas of hemorrhagic infiltration, and did not bleed as freely as the average case. When the amniotic sac was opened the fluid spurted three to four feet above the patient's abdomen, so great was the intrauterine pressure. The child was promptly delivered and found to be dead. Blood clots sufficient to fill an ordinary wash basin were scooped out and the uterus quickly closed with two layers of interrupted chromic catgut suture. The abdominal wall was closed in the usual way. Time of operation 24 minutes.

The pulse at the close of the operation was still poor in quality, though there was little fresh bleeding either during the operation or following it. One thousand c.c. of saline solution were given intravenously, and one hour after the completion of the operation she had recovered from the anesthetic and said she felt fine.

On the sixth day after the operation she developed a temperature of 102°F. and a septic sore throat, running an afternoon temperature for five days. Believing that another transfusion would increase her resistance, she was given 250 c.c. of her husband's blood; following this she improved, clinically, her temperature falling to normal. As after the first transfusion her white blood-count increased considerably, from 24,000 to 40,500; the first increase having been from 16,600 to 26,500. She was discharged on her twenty-third day, much improved.

Interesting points in this case are: 1. Of the several causes advanced as factors in the etiology of accidental hemorrhage, this patient presented three, viz., trauma, a marked pregnancy toxemia, and a short umbilical cord (17 cm.). 2. Extreme intrauterine pressure. 3. Gross appearance of the uterus in situ, corresponding to that described by Wing,<sup>1</sup> and by the author in a previous publication.<sup>2</sup> 4. Relatively large amount of free peritoneal fluid. 5. Leucocytosis and clinical improvement following the two transfusions.

<sup>1</sup>Wing, L. A.: Report on Two Cases of Accidental Hemorrhage, Bulletin Lying-In Hospital, City of New York, April, 1916, p. 162.

<sup>2</sup>Quigley, J. K.: Accidental Hemorrhage and Its Treatment, New York State Jour. Med., November, 1916.



CASE 2.—Hematuria in pregnancy. Mrs. S. F., aged thirty; para I; private case No. 453. Family history, negative.

*Personal History.*—Simpler diseases of childhood, appendectomy at 24, "clean case" with this exception, patient has been quite well all her life. Menstruation began at 13; quite irregular at intervals varying from six to eight weeks; flow moderate in amount and accompanied by some pain.

Married nine years and never pregnant before. Three years ago she underwent an operation on the cervix for sterility. Last menstruation September 16 (three months ago). She has suffered from a moderate amount of nausea and slight vomiting. No headache. No constipation. Physical examination shows patient of moderate height and weight, well nourished, and of good color. She has a well compensated mitral regurgitation. Lungs normal. Pelvic measurement normal. Blood pressure 128/80. *Urinalysis:* Amber in color; clear; acid reaction; sp. gr., 1.020; no albumin or glucose; no sediment. Vaginal examination confirmed the diagnosis of pregnancy. With the exception of some digestive disturbance, the patient, objectively and subjectively, was quite normal until April 26, four months after her first visit; and in the seventh month of her pregnancy, the urine showed a good trace of albumin, a moderate number of leucocytes, and a few red blood cells. The blood pressure was 122/78, and her only complaint, at this time, was excessive "heartburn." A simple antacid mixture was prescribed and the proteins in her diet much reduced.

For four weeks the urine examinations were about the same, viz., a trace of albumin, a few leucocytes and red blood cells; but she developed an almost intolerable general pruritus and insomnia. She had neither headache, nausea, nor epigastric pain.

On May 31, five weeks after the first appearance of albuminuria, the systolic blood pressure rose to 142, and the urinalysis showed smoky color; acid reaction; sp. gr. 1.019; albumin, 2 per cent; sediment contained a preponderance of red blood cells; no casts; no renal cells.

Her confinement to bed and the milk diet, begun four days before, were continued. Three days later a more complete urinalysis showed a smoky specimen; total solids low, 21.4 gm.; urea low, 4.6 gm.; trace of albumin; many red blood cells; no casts. June 10, she developed slight edema of the ankles, and the systolic blood pressure rose to 160. At times the urine was quite red and smoky. During the next fortnight her blood pressure remained high; but the hematuria and albuminuria gradually diminished.

There were at no time symptoms of toxemia beyond the insomnia and pruritus. A failure to more thoroughly analyze this case by cystoscopy, blood chemistry, and renal function test was due to the fact that the patient was near term, and because after rest in bed and regulation of diet the hematuria cleared up and never returned.

On June 25 she went into labor. After nine hours of severe pains, I found a fully dilated cervix, head floating above the inlet and a tonically contracted uterus. Because of this, and a history of ten years' sterility, and great desire for a living child, Cesarean section was offered as the safest delivery. This was accepted by the patient and the operation performed. Her convalescence was uneventful; the blood pressure fell to very near normal, and the albumin disappeared.

Of the various causes offered for hematuria, and for hematuria in pregnancy in particular, it seems to me that the most plausible etiologic factor in this case was a toxemia, as evidenced by increased blood pressure and edema.

# Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-THIRD ANNUAL MEETING HELD IN ATLANTIC CITY, N. J., SEPTEMBER 20-22, 1920.

THE PRESIDENT, DR. GEORGE W. CRILE, IN THE CHAIR.

DR. JOSEPH H. BRANHAM, of Baltimore, Md., read a paper on **Some Interesting Surgical Conditions of the Liver and Biliary Tract.** (For original article see page 331.)

## DISCUSSION

DR. ORANGE G. PFAFF, INDIANAPOLIS, INDIANA.—It would be well to emphasize one point in connection with this paper, namely, that we must aim to be conservative in the treatment of gall bladder diseases. In the last few years the statement has been frequently made that a gall bladder once diseased is always diseased, but that is not always so. If we open the abdomen on account of symptoms and find no stones, and find comparatively little pathology that is demonstrable, and if the gall bladder is not easily emptied by compression I believe that gall bladder ought to be drained.

DR. BRANHAM (closing).—I wrote this paper largely to put on record a case of fistula between the gall bladder and the stomach. The only other mention of this condition I can find in literature is by Dr. Deaver, as quoted in this paper.

DR. ROBERT T. MORRIS, of New York, N. Y., read a paper entitled **Where the Rubber Glove Is Behind the Times.** (For original article see p. 334.)

## DISCUSSION

DR. HERMAN E. HAYD, BUFFALO, NEW YORK.—We all agree with Dr. Morris that long incisions are perhaps in most cases unnecessary, and particularly when the object is to investigate a lot of possible pathology which the ordinary diagnostician ought to have made out before he operated. He did us a good service when he taught us to do our surgery through small incisions and to develop our faculty of tactile sense; but I was rather surprised that such a judicial operator should have put before this association so strongly the results of the work of Kennedy who is one of the representatives of the well-known Joseph Price. However, when he tells us that 99 per cent of the cases that other men operated on who wore gloves had adhesions, as quoted by Dr. Morris, and he and others only had 7 per cent adhesions without the use of gloves, I consider the statement ridiculous. Out of 100 cases there were at least some 60 to 75 per cent that were the simplest kind of operations which could only have taken a short time to perform and would have

achieved the best results that Dr. Morris expects from the physiologic era of surgery. There is no need because we wear gloves to produce traumatism from handling the tissues and there is no necessity except in the rarest cases in exploring the abdominal cavity to find possible foci of irritation or pathologic lesions. I do not believe Kennedy's deductions and I do not believe it is possible that adhesions could take place in the hands of 99 men from the use of rubber gloves, and Kennedy's patients only have 7 per cent adhesions.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—I approve of the first three sentences in which Dr. Morris tells us that if we were to standardize the medical profession we would immediately stop progress. A few years ago the Carnegie Foundation sent out a report with the endeavor to induce us all to teach medicine exactly alike, and as a consequence various colleges all over the country were turning out medical graduates as much alike as peas from the same pod. Now, the American College of Surgeons is trying to have us make our histories exactly alike. It would be no more ridiculous to make each one of us read papers alike before this association. Every one of us agrees that we should have complete histories, but to make me follow out exactly the method of others is a foolish thing. We want to provide for individuality.

When it comes to the rubber glove proposition, I, like Dr. Hayd, cannot believe the rubber glove in and of itself causes adhesions. I can conceive of a man with rubber gloves being rough, and a man without rubber gloves scratching tissues with his finger nails. One of the things that induced me at an early date to use rubber gloves was the fact that my finger nails were very hard to keep clean. I seldom knew whether I had them clean or not, and I felt it was better to cover them up with something that I could boil. That the rubber glove does obstruct tactile sense a little nobody denies. For the purpose of making a minute and accurate diagnosis, I do not want to use a glove in making a vaginal examination. If a man does not often get his hands in pus, he can keep them fairly clean and sterilize them sufficiently to get along, but the average man will do more aseptic surgery if he uses rubber gloves.

DR. JOHN W. KEEFE, PROVIDENCE, R. I.—There is no question that a man with rubber gloves on cannot feel as readily as though he did not wear them. When rubber gloves first came into use I employed them in almost all the cases I had, but now and then I met with difficulties, so I took the gloves off as I thought I could feel better without them. I told Dr. McBurney about my difficulty and he said that this attitude was a mistaken one. The gloves should be kept on in a difficult case and your fingers educated as to how differently things feel with the gloves on. I have practiced that ever since.

It seems to me when you have educated your fingers to the feel of tissues with the glove on, there is very little difference between that impression and one without the glove. Of course it takes some time to educate the sense of touch with a glove on. Undoubtedly the rubber glove has done more to save lives than any other thing among surgical appliances.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—I believe that rubber gloves protect us from infection. This was vividly impressed upon my mind in the case of one of my former chiefs who received a primary chancre of the right hand while attending an obstetrical patient.

In a city like New York, not only is it unsafe to operate without gloves, but it is unsafe to examine patients in the office without them. As a measure of protection, gloves are one of the best things for the physician to use.



DR. MORRIS (closing the discussion).—In regard to the remarks of Dr. Hayd, I took Dr. Kennedy at his word. He referred to adhesions to the abdominal line of incision, and not to other adhesions.

Dr. Bonifield brought up the question of standardization. We have to bear in mind what would have happened if Darwin and Galileo had been standardized according to the thought of their day.

Dr. Hedges asked why we need to use longer incisions with gloves. Simply because the tactile sense is diminished, and we have to bring into employment another sense. Instead of using one sense we use two, and the second one is poorer in quality than the first.

In regard to Dr. Rongy's remarks, I brought out the point that it is only in peritoneal surgery that the surgeon is behind the times if he employs rubber gloves in his work. As a general statement, the use of rubber gloves is one of the most distinct advances ever made in surgery. They belong to standardization and I employ them religiously except in this one field, where neater and safer work is done without them.

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DR. EDWARD J. ILL, of Newark, N. J., described **The Gehrung Pessary for the Relief of Cystocele.** (For original article see page 338.)

#### DISCUSSION

DR. ABRAHAM J. RONGY, NEW YORK CITY.—I was confronted with the same problem in the case of a woman who has had a high blood pressure and also a complete procidentia for a great number of years. Another woman, seventy-two years of age, had a complete procidentia and was very miserable. No mechanical manipulation could retain the uterus in the vagina, so I decided to operate on these patients, resorting to sacral anesthesia, and the only pain the women had was when I entered the anterior fold of the peritoneum and after that they had no pain whatsoever.

As to the question of the use of pessaries, I have tried every pessary on the market, and I have come to the conclusion that the only way to use a pessary is to make it and mould it in the office according to the dimensions of the vagina. The only contrivance that will hold a heavy uterus in a relaxed vagina is a soft rubber pessary which will fit around the cervix, and this supported by a hard rubber pessary. The hard rubber pessary will distend the vagina, and the soft rubber pessary will prevent the cervix from coming down.

DR. CHARLES L. BONIFIELD, CINCINNATI, O.—The use of pessaries has gone out of fashion and I explain to patients when I use a pessary that it is not a curative agent, but enables them to be up and around like a crutch enables one with a broken leg to do so. Many gynecologists of the younger generation do not understand the principle upon which the pessary acts. The effects of a good retroversion or retroflexion pessary is practically the action of shortening the uterosacral ligaments; it pulls the uterosacral ligaments over the lever put up behind the uterus. A retroversion or retroflexion pessary will never act satisfactorily unless the patient has a normal posterior culdesac. A second requisite for a pessary to work properly is a vagina with sufficient muscular coat to hold the pessary in position.

DR. HERMAN LORBER, NEW YORK, N. Y. (by invitation).—I want to say that under the instruction and guidance of Dr. Herman J. Boldt we have used the Gehrung pessary for fifteen years. We have often made these pessaries out of

round hard rubber pessaries. The front bar should rest behind the symphysis and the cervix in the concavity between the two bars. It takes up the slack in the vagina and the front bar resting behind the symphysis prevents the bladder from coming down. It will often work when no other pessary will act satisfactorily.

DR. K. ISADORE SANES, PITTSBURGH, PENNSYLVANIA.—I have been using the Gehrung pessary with excellent results. Whether the position as shown by the essayist is the only correct one I do not know. As I insert it the pessary lies with its concavity up so that its narrower two bars are in the lateral fornices.

DR. ILL (closing the discussion).—I want to emphasize the fact that this pessary is for the purpose of holding up a cystocele of moderate extent. It should be used only in patients in whom we cannot operate. Gehrung has worked out this form of pessary with such success, I do not see how it can be improved.

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DR. JAMES E. KING, of Buffalo, N. Y., presented a paper on **Endocrine Influence, Mental and Physical, in Women**. (For original article see page 341.)

#### DISCUSSION

DR. WILLIAM M. BROWN, ROCHESTER, NEW YORK.—I understood Dr. King to make the statement that during pregnancy there was a high sugar tolerance. I have seen it stated and personally believe that during pregnancy there is a very low sugar tolerance.

DR. GEORGE W. CRILE, CLEVELAND, OHIO.—While listening to the fascinating and interesting paper of Dr. King, I recalled the fact that when some years ago we were doing experimental work, we found that the injection of extract of the placenta caused a very markedly increased output of adrenalin, and that it also produced a hyperchromatism of the brain cells. Adrenalin alone causes hyperchromatism of the brain cells. It would appear, therefore, that the placenta acts upon the adrenals directly. We all know that the thyroid gland governs and activates most of the body, including the other endocrine glands; and it has been shown that adrenalin will increase the activity of the thyroid. The enlargement of the thyroid gland during pregnancy, as well as during sexual activity, is very marked. This interaction is to be interpreted as Dr. King has suggested on a mechanistic basis. Dr. King's conception of human behavior, human evolution, and human development is more or less mechanistic, and is in accord with my own point of view that our further knowledge of the phenomena of pregnancy as of all other normal and pathologic phenomena will be better understood as we become better able to interpret them on a mechanistic basis.

DR. KING (closing the discussion).—Dr. Brown has asked regarding high sugar tolerance. Every pregnant woman has not high sugar toleration. It is only those that have the suggestion of acromegaly, and the physical changes and evidences of hypopituitary secretion.

There are many interesting things that might have been considered. In estimating the effect of these glands upon the mentality and the behavior of women, we must take into account environment and education and the natural surroundings of women, but fundamentally I believe, as Dr. Crile has indicated, that we shall find a great many of the impulses we have hitherto regarded as fundamentally due to the intellect to be due to the stimulus of the endocrine system.

DR. THURSTON S. WELTON, of Brooklyn, N. Y., read a paper entitled **Double-Flap Low Cesarean Section Results.** (For original article see page 350.)

#### DISCUSSION

DR. JAMES K. QUIGLEY, ROCHESTER, NEW YORK.—I should like to ask Dr. Welton to describe his technic in delivering the placenta and the way it was done. I understand it was through the vagina.

DR. WELTON.—No. I said it might be pushed through the cervix, but usually we delivered it through the wound.

DR. QUIGLEY.—If infection comes from infecting the liquor amnii, what is the rationale of protection in these cases?

DR. PAUL TITUS, PITTSBURGH, PENNSYLVANIA.—I think Dr. Welton brought out an important point when he referred to the condition which he termed potential infection. It requires comparatively little manipulation to place a case in the category of "potentially infected," and the ordinary classical Cesarean section then becomes a hazardous matter for a patient where it might have been of little or no risk to her had she been let alone. Mortality, or at least morbidity, increases in direct ratio to the length of time a patient has been in labor before a classical Cesarean section is decided upon, and the rupture of the membranes definitely increases the mortality of this operation. In other words classical Cesarean section should be done only under ideal circumstances in order to obtain good results.

Some type of extraperitoneal Cesarean section can be substituted in cases which are possibly infected, whereas the Porro operation can still be done in those which are probably or definitely infected. The operation which Dr. Welton has described seems to be a modification of the Kroenig-Gellhorn method of performing extraperitoneal Cesarean, the term extraperitoneal meaning, of course, that the point of incision into the uterus is made extraperitoneal before the uterus is actually opened.

For about seven years I have been using Frank's original method which incises both the parietal and the uterine peritoneum and then by suture unites the parietal leaf to the uterine, thus making a peritoneal fistula down to the surface of the uterus. This operation I applied to some twenty or more cases which were, as Dr. Welton has termed it, potentially infected. Some of them, indeed, were so doubtful that rather a risk was taken in employing even this operation. It proved uniformly satisfactory, however, and I have had the opportunity subsequently to perform classical Cesarean section on four of these women. The abdominal cavity was free from adhesions even in those women who had been drained through the original wound and the general results in the abdomen were far better than after the average classical operation. For all other cases I employed the classical Cesarean up to about eighteen months ago.

About that time DeLee of Chicago read a paper before the American Medical Association here at Atlantic City in which he definitely preferred the Kroenig-Gellhorn type of lower uterine segment incision to the classical Cesarean. At the time I was quite skeptical of the advantages which he outlined for this operation, but shortly after we had some disturbing results with some cases in my clinic which were allowed to go some time in labor, of course without vaginal examinations. These patients all had borderline contraction of the pelvis and it was hoped that they might be able to deliver themselves. Classical Cesarean section was done on them because they were supposedly clean cases, but one after another developed elevations of temperature that were very disconcerting, to say the least. In consequence of that I began doing the Kroenig-Gellhorn type of operation, which is quite similar to the one



the essayist has described, except that by turning down a triangular flap the suture line in the uterus does not cross under the suture line in the peritoneum. At first this was used only in case a test of labor had been given, but the general advantages and benefits which Dr. Welton has outlined have been experienced so uniformly in my patients that I am thoroughly converted to the idea that this type of operation is superior in every way to the old classical Cesarean section.

DR. ROSS McPHERSON, NEW YORK CITY.—There has been a little query in my mind as to the peritoneal spill. I can see that in this operation the spill, of course, takes place in the lower part of the abdomen whereas in the classical operation the spill is all over the abdomen, which may account for the general peritonitis instead of a local one in this new operation, but for the seriously infected cases I have been doing the real extraperitoneal operation for some time. I do not use the Hirst operation for the simple reason that if you could open a woman's abdomen and suture the uterine peritoneum to the abdominal peritoneum and leave it for twenty-four hours it would be all right but I do not see any reason why bacteria should not come through suture holes into the abdominal cavity. If an extraperitoneal operation is indicated, why not do true extraperitoneal procedure? We have done a good many of them at the Lying-In Hospital in New York City with perhaps not as good results as Dr. Welton and Dr. Polak have had in their cases but infinitely better than a craniotomy on a living child or a dead mother as the result of the classical operation.

DR. E. GUSTAV ZINKE, CINCINNATI, OHIO.—When Saenger, of Leipsic, formulated the modern classical Cesarean section, we thought the *ultima Thule* had been reached; but it seems not. However, what he said at the time remains true still; namely, that the success of the operation depends upon the perfect union of the uterine wound.

I can see no particular advantage in the operation presented. If there is a real infection and the uterus is left behind, this operation does not prevent a spread of the infection. All depends upon the nature of the infection. If you have merely the saprophytic infection, your patient, in all probability, will recover if the proper precautions and after-treatment are applied. If you have a streptococcal infection, no operation will prevent extension of the infection. It is an operation which, in some instances, may do good; but all will depend upon the nature of infection in the case.

DR. WILLIAM M. BROWN, ROCHESTER, NEW YORK.—I have not yet convinced myself that there was any need for the low Cesarean section. I cannot see why we should have an amniotic spill. You can prevent soiling of the peritoneum just as well in doing Cesarean section through a small incision above the umbilicus as you can by a low incision, and I believe the peritoneum will take care of the ordinary infection, so far as amniotic spill is concerned. I do not worry about that at all. I keep the peritoneum; I do not traumatize it by mopping. It has been a long time since I have had a death from Cesarean section. It has been my custom to clamp the uterine incision right to the abdominal wall, and very often I never see any contents of the peritoneal cavity excepting the uterus, and I do not have any amniotic spill or any soiling of the peritoneum. It seems to me, when you take the added time and added difficulties and added traumatism in the lower uterine segment in peeling off the peritoneum intact; where the infection is down in the lower part of the uterus or in the cervix, you are traumatizing an area where infection is going to spread, and if you get an abscess in the vesicouterine space, you will have more trouble than anywhere else, I would take my chances even with a virulent infection by doing a high classical Cesarean section.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—In defense of this procedure I wish to call attention to two or three points. In the first place, I do not think any of us believe that we get infection from the amniotic spill. The infection comes in a different manner. From a study of our autopsy findings, and we have had autopsies upon a number of classical Cesarean sections who have died of peritonitis, we get the same picture we get in a suppurating wound of the abdominal wall. Along the course of the stitch hole we get infection from the endometrium out. We do not believe that those patients that actually have infection of the lymphatics going into the blood, will live with this procedure. We do believe, however, that those cases that would have ordinarily died of peritonitis by the transit of bacteria from the endometrium to the peritoneum along the suture line, will survive with this technic, for instead of a peritonitis we confine our infection to the parametrium. We have had several abscesses from the lower segment and they were extraperitoneal. Two of them discharged through the wound in the uterus. Early rupture of the membranes exposed the woman to definite infection of the endometrium; that is, the endothelial lining or covering of the amnion cells is changed and the resistance of the woman is diminished. We have found by pathologic study that there is a deciduitis in these cases in the placenta. I have seen these patients recover after one rise of temperature between the first and sixth day.

With regard to the Frank operation, we did that prior to adopting Beck's procedure, and the objection we had to it was that it took more time, and we frequently opened into the peritoneal cavity by accident.

One other point in regard to the placenta. In those cases in which there has been definite evidence of infection, we have been in the habit of pushing the placenta right through the vagina out instead of drawing it through the wound. We have been thoroughly impressed by the fact that technically this operation is not difficult. The wound is low down, and we believe from the limited experience we have had, it is not as liable to cause subsequent rupture as the higher wound. That is the simple claim we make at the present time. We have had three of these women come back and go through labor again. We hope to have all of them if we can.

DR. WELTON (closing the discussion).—Dr. Polak has very kindly answered most of the questions asked by Dr. Quigley, Dr. Brown, and Dr. Zinke, and I will only speak of one point that Dr. Titus brought up regarding his operation and the operation we do.

The shorter duration of the operation, the ease of exposure, the very few technical difficulties and less troublesome delivery of the child are points apparently in favor of the classical section, and may be regarded by some as disadvantages of the technic we have described. These disadvantages, however, scarcely warrant consideration if further experience with our procedure continues to show as it has shown in the past that it offers better protection against hemorrhage, peritonitis, and adhesions, and is followed by an easier convalescence and less risk of uterine rupture during a subsequent pregnancy.

DR. EDGAR J. DARNALL, of Atlantic City, N. J., presented a report on a case of **Hernia of the Ileum through a Rent in the Mesentery**. (For case report, see page 366.)

#### DISCUSSION

DR. GEORGE A. PECK, NEW ROCHELLE, NEW YORK.—May I ask the writer whether he did an anastomosis with the Murphy button at the time of operation?

DR. DARNALL.—There were two operations, one of which was an anastomosis made by the Murphy button, and the other an operation for hernia.

DR. PECK.—My point is whether resection of the intestine should be done during obstruction. If an enterostomy can be done at that time and drainage secured, it is a much shorter operation, and patients often will recover from enterostomy, which is a short operation, where they would not recover from a long operation as in doing an end-to-end or any other form of suturing or uniting the bowel after resection.

I want to make the point whether we should not, when we possibly can, in obstruction of the bowel, do enterostomy, and not a resection of the bowel.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—I want to make a remark on the point the last speaker brought out, namely, whether we should resort to enterostomy or to anastomosis in case of obstruction of the bowel. In my opinion that depends more on how long the obstruction has existed than on the immediate condition of the patient. It has been pretty well demonstrated that when there is partial or complete obstruction of the small intestine, the contents of the bowel above the seat of obstruction become poisonous, and that if we release the contents into the healthy bowel below, our patient will often suffer collapse and die from poisoning in a few hours as if we had not operated, while if the intestine be drained, the patient will get well.

DR. ROBERT T. MORRIS, NEW YORK CITY.—I would like to emphasize the point brought out by Dr. Bonifield, as I think it is the crux of the whole situation.

DR. DARNALL (closing the discussion).—The contents of the intestine had already drained out and were free in the abdominal cavity. There was no obstruction from above.

As to whether we should make an enterostomy and do drainage or not, or whether we should do anastomosis, I think, as Dr. Bonifield says, it is largely a question of the condition of the patient and where the obstruction is. In the fistulas of the upper bowel we all have had the experience that if we allow them to continue to drain, the patient becomes dehydrated, is soon exhausted and dies; whereas if the fistula is around the lower ileum or in the colon, we do not have that trouble, the fistula has a tendency to close spontaneously and the patient recovers. So, it seems to me, a point of good judgment that we do not drain the upper part of the bowel too much.

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DR. O. G. PFAFF, of Indianapolis, Ind., presented a report on a case of **An Unusual Abdominal Cyst**. (For case report, see p. 367.)

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DR. WILLIAM M. BROWN, of Rochester, N. Y., presented two case reports: **1. Encephalitis Complicating Pregnancy near Term. 2. Malignant Disease of the Cervix in a Young Primipara**. (For case reports, see p. 368.)

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DR. JOHN WILSON POUCHER, of Poughkeepsie, N. Y., presented a case of **Rupture of the Bladder during Labor**. (For case report, see p. 371.)

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DR. JAMES K. QUIGLEY, of Rochester, N. Y., reported two cases: **1. Accidental Hemorrhage with Cesarean Section. 2. Hematuria in Pregnancy**. (For case reports, see p. 372.)



THE NEW YORK OBSTETRICAL SOCIETY. MEETING OF  
OCTOBER 12, 1920.

THE PRESIDENT, DR. FRANK R. OASTLER, IN THE CHAIR.

DR. ALBERT M. JUDD presented a case of **Sarcoma of the Ovary**.

Dr. Judd stated that he presented this case not because of the rarity of sarcoma of the ovary, but because of the unusual complication of a twisted pedicle in a solid ovarian growth.

The patient, sixteen years of age, single, was admitted to the hospital, September 10, 1920, with a history of severe abdominal pain which came on with the onset of the last menstrual period on September 3, persisted throughout the same and continued for five days after its cessation. Her menstruation began at eleven, was regular except the month before the last period, during which she flowed on three occasions four days at a time. A severe dysmenorrhea was usually present on the first day of each period. The patient on admission presented the appearance of acute illness. Examination of the abdomen showed a spherical mass in the right lower quadrant extending up to the level of the umbilicus. This mass was tender to the touch but there was no evidence of peritoneal irritability; no abdominal distention or rigidity. The hymen was intact and a rectal examination showed a uterus of normal size with the right fornix occupied by a mass. Operation was done on the next day through a median abdominal incision and a tumor about the size of a grapefruit was found, which sprang from the left ovary by a long pedicle twisted three times. The surface of the growth was markedly congested and the left tube, which was involved in the twisting process, was gangrenous. The appendix was acutely inflamed. The left tube and ovary were removed, likewise the appendix, and the wound closed in layers without drainage. A preoperative blood count showed a white cell count of 18,400 with 83 per cent polynuclear cells and 17 per cent lymphocytes. The patient made an uneventful recovery and the wound healed by primary union. The pathologist reported the tumor to be sarcoma.

## DISCUSSION

DR. L. W. STRONG.—Solid tumors of the ovary are not very common. Fibroma is the commonest and next myoma. As to sarcoma, I think the figures given generally are that from 5 to 10 per cent of all ovarian tumors are sarcomatous. As for the twisting of the pedicle in a solid tumor rather than a cystic tumor, it seems to me that the globular tumor is more labile in its anchorage than the solid tumor. In a solid tumor the attachment is firmer than in a globular tumor. It is more apt to have a broad attachment, and that is the only reason I can give for the fact that twisted pedicles in solid tumors are unusual.

DR. J. M. MABBOTT.—I recall a case of a young woman who had a solid tumor. She went several months without menstruating. I suspected at first that she was pregnant and frankly told her so, although she was unmarried. Later I became satisfied that she had a solid tumor in the pelvis, but I was unable to persuade her to go promptly for operation. One night she had a severe attack of pain and was taken to New York Hospital, and we found a solid tumor of considerable size with a large twisted pedicle and so congested that it was actually oozing a bloody serous material into the peritoneal cavity. The patient recovered rapidly from the operation, but within one year she developed a diffuse, nodular sarcoma in the pelvis and abdomen and was operated in the Presbyterian Hospital; but within a few hours the

patient succumbed from the operation which was little more than exploratory, having been deferred too long. It was a dermoid cyst to begin with, containing hair, fragments of bone and teeth.

DR. HERMANN GRAD.—I recall a case of a pelvic tumor in which both ovaries were solid. One tumor was quite large, the other was somewhat smaller. Both tumors were removed and proved to be sarcomatous. In that case the patient had a metastasis within four months and died. Those are the only solid ovarian tumors I have seen.

DR. L. M. STRONG.—Dr. Judd suggested that I might make some reference to the question of removing the other ovary. I think this should be done. The tendency to metastasis from one ovary to the other is very noticeable, not only in sarcomata, but in all malignant conditions, and for that reason it is not unusual to find them to be bilateral.

DR. F. R. OASTLER.—Should the uterus likewise be removed?

DR. L. W. STRONG.—In answer to the question as to the removal of the uterus, I would say there is nothing against it. In malignant tumors it should be done.

DR. H. N. VINEBERG.—I have encountered a number of solid tumors of the ovary and I would be very sorry to have it go forth from this society that where there is a sarcoma of the ovary it is necessary to remove all the pelvic organs. In at least four cases that I have been able to follow up, in which the involved ovary was removed, there has been no recurrence for several years. I particularly recall the case of a young woman with an enormous carcinoma of the ovary, in which case I simply removed the growth. She was a girl then and was supposed to be pregnant because she had such a large tumor. She married afterwards and I kept track of her for ten or fifteen years. She had a child and remained perfectly well. Another patient from whom I removed a solid growth of the ovary (sarcoma) lived a number of years and died of an intercurrent disease. A third case in a girl eighteen years of age, with myxosarcoma of the right ovary and a very large ascitic collection in the abdomen, was operated in 1900. She married later and has had three children. I would therefore not advise removing all the organs because one ovary is malignant. I think in those cases that have been reported here, even where the condition was double, nothing was gained by removing the uterus, as recurrences occurred very early.

Another case which is more relevant to the subject under discussion tonight, was the case of a solid tumor of the ovary, which I recognized as such. The doctor who referred the case was a very conservative internist. He did not follow my advice of having the patient operated promptly, but, instead, said he would keep the patient under observation. About three months afterwards he called me up and said that the patient had been seized with severe pain and was in collapse and he wanted her admitted to the hospital. This was done and the patient operated on. The growth in this particular case was solid with a twisted pedicle, and there was a rupture of the tumor, which was partly cystic, resulting from the twist. The patient died a short time afterwards from recurrence because the sarcomatous elements were spread all over the abdomen. But the thing that I should like to lay emphasis on (because I think very few of us have had many cases, although it has fallen to my lot to have seen quite a number) is that by limiting ourselves simply to the removal of the growth the results obtained are good, and it is not necessary to remove the other ovary, if normal, or the uterus.

DR. ALBERT M. JUDD.—I did not report this case because it was a sarcoma of the ovary, but simply because of the twist, which, in my experience, is rare in solid

tumors. I made the suggestion to Dr. Strong that I had expected to be criticised for not removing both ovaries in view of the fact that one ovary was sarcomatous. This tumor was of the left ovary, fell over the uterus in front into the right fornix and the pedicle was twisted three times.

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DR. LAWRENCE W. STRONG read a paper on **Vaginal Cysts**. (For original article see page 357.)

#### DISCUSSION

DR. ALBERT M. JUDD.—I had two cases of labor, where I had to remove from the vault of the vagina, in order that labor might proceed, a cyst located in the posterior fornix, which was large enough to interfere with delivery. Although not studied microscopically they evidently were of the type described by Dr. Strong as developing from the ampulla of Gärtner's duct. I saw also last winter at the Jewish Hospital a bilateral vaginal cyst about the size of a half-dollar, which we removed in the course of plastic work on the vagina. These tumors are of considerable interest to the obstetrician.

DR. S. H. GEIST.—I have here a gross specimen of a cyst which Dr. Brettauer removed a few days ago. This cyst is typical of a Gärtner's cyst. It was in the right side of the cervix, extending into the right vaginal vault. It was dissected out entirely. There was nothing unusual in the history of the case. The diagnosis was a simple one, but it was a rather difficult operation. However, it came out completely. It is unusual because it has a rather thin wall. The uterine artery was close to it and had to be pushed aside very carefully.

DR. JOSEPH BRETTAUER.—The fact that there are two men present who have come across vaginal cysts appearing with labor must change the aspect of these cases. Dr. Strong says they have no clinical significance. In that I do not agree with the doctor.

I know of a young woman who was confined three times without incident although she had one of these cysts before her marriage. When her fourth baby was born, the cervix was fully dilated. I did not confine her at any time, but I saw her three times and saw her during her labor with the fourth baby. She had had three perfectly normal labors. There was only one thing to do, and that was to open the cyst and drain it and let labor continue. The cyst was opened and in fifteen minutes the baby was born. After six months it closed again, began to grow, and had to be shelled out.

These cysts are not very common. Vaginal cysts lower down are more common. In these cysts, so far as I remember, one never finds any squamous patches. The embryologic history would rather make that an unusual finding.

DR. FLORIAN KRUG.—I am glad that Dr. Geist, as well as Dr. Brettauer, mentioned the fact that there are technical difficulties connected with the removal of these tumors. Many years ago I made up my mind as to what I was going to do with the next case that fell into my hands, after enucleation of a very thin-walled cyst. The difficulty with these cysts lies in the fact that they are easily ruptured and after the fluid is out, it is difficult to excise them. After emptying these cysts a sterile solution of paraffin was injected into the cavity (it was not necessary to fill it completely, but just enough to distend the cyst wall). The paraffin was made hard by an ether spray and it was a simple matter to make an incision and shell out the cyst the same as a solid tumor.

DR. H. B. MATTHEWS.—There is one form of cyst that does not belong to the particular variety which has been discussed, but I think it is of some importance. I



have reference to inclusion cysts following perineorrhaphy, where incomplete denudation provides a nidus for cyst formation. In such a case the woman was at term and went into labor. As the head came down a vaginal cyst the size of a lemon produced obstruction and in order to keep from rupturing it, the cyst was enucleated.

DR. LAWRENCE W. STRONG.—I am very glad to be corrected in regard to the interest of these cysts. I said it more by way of apology in presenting a subject which I did not think would bring out so much discussion. The inclusion cysts I would classify with the traumatic cysts. That is why I did not mention them. They present no typical features.

**DR. GORDON GIBSON presented a specimen and report on a case of Ruptured Interstitial Pregnancy.**

The patient, age twenty-two, negress, was admitted to the Long Island College Hospital on August 24, 1920, complaining of pain in the left lower quadrant of the abdomen. She had been married one year and a half, and had had one spontaneous miscarriage at four months, four months after marriage. Menstrual history regular; last period in May, 1920. On July 15 she began to bleed slightly. This continued for three days and was accompanied by severe pain in the left side of the abdomen. From that time until the day of admission to the hospital she had constant pain

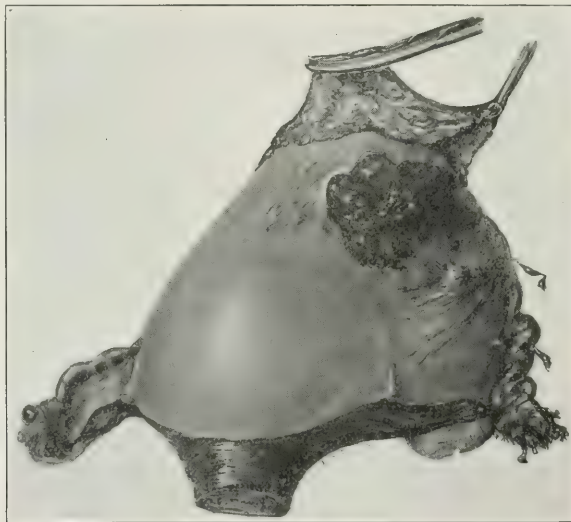


Fig. 1.—Anterior view, after hardening, showing rent in surface of uterus.

in the left side. Pelvic examination on admission showed the uterus the size of a four months' pregnancy, irregular in shape and consistency and a hard nodule about the size of an orange, tender on palpation was noted in the region of the left cornu. A slight, bloody vaginal discharge was present. A diagnosis of pregnancy complicated by a fibroid was made, with an impending abortion. As the symptoms improved, the patient was discharged on September 1. Four days later she was seized with a sudden acute pain in the abdomen and collapsed. She remained in bed during the day and was re-admitted to the hospital September 7th in a condition of shock. The entire abdomen was rigid and tender with the maximum point of tenderness over

a mass in the left lower quadrant. The blood count showed, 2,600,000 red cells, with 40 per cent hemoglobin, and on August 27 this had increased to over 4,000,000 red cells with 65 per cent hemoglobin. With the rest in bed, the general condition improved and operation was finally done on September 10. A considerable amount of clotted blood was found in the abdomen. The omentum and several loops of small intestine were adherent to the fundus. There was a rent in the uterine wall about one and one-half inches long in the left upper anterior surface through which a fragment of placenta protruded. The omental adhesions were divided, the intestines separated from the mass and a supravaginal hysterectomy done. Aside from an attack of bronchopneumonia the patient made a satisfactory recovery. The nature of the specimen was not apparent until a careful examination after hardening. It

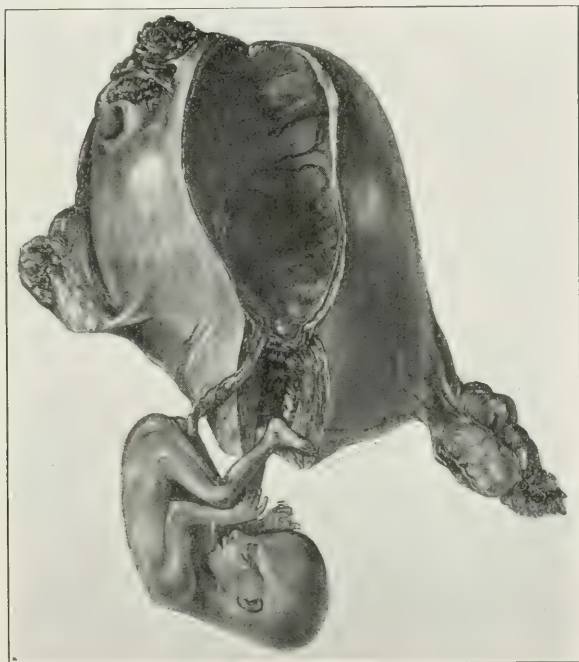


Fig. 2.—Posterior view, after hardening, showing gestation sac separate from uterine cavity.

was then found that the condition was one of interstitial pregnancy of about four months' duration in the left cornu. The gestation sac was entirely separated from the cavity of the uterus.

#### DISCUSSION

DR. JOSEPH BRETTAUER.—I never have had a personal experience with a case of interstitial pregnancy, but I desire, in referring to a case, to indorse the doctor's remarks as to the severe hemorrhage which interstitial pregnancies give rise to when they rupture. Fifteen years ago or longer a woman was admitted to the Mount Sinai Hospital in a very precarious condition. The abdomen was full of fluid blood, but the source of the bleeding was not determined. Both tubes were absolutely normal, although a diagnosis had been made of ectopic. They were slightly congested, but there was no rent in them. The abdominal cavity was investigated further and it was flushed out and dried as well as possible. No lesion was found. At the left cornu of the uterus there was a little blood-clot. A rent, not larger than

a quarter of an inch, was found at the junction of the tube and uterus. The tube contracted and stopped the hemorrhage by the time the abdomen was opened. The patient recovered.

DR. H. N. VINEBERG.—As a corollary to the case which Dr. Brettauer just reported a general surgeon opened a case for symptoms of intraperitoneal hemorrhage and also made a very thorough search of the tubes and ovaries and stomach and found nothing. He closed the abdomen and the patient died within twelve hours from continuous hemorrhage. The next day a postmortem examination was made and an early interstitial pregnancy was found which had ruptured.

One of the first cases of interstitial pregnancy which I had was considerably like the one reported here tonight. In this case the patient was admitted on the medical service as a case of general peritonitis. I made a diagnosis of probable rupture of a pregnant uterus. I did not think of interstitial pregnancy at the time. The case was transferred at once to the gynecological service and the abdomen was opened. There was not a great deal of blood in the peritoneal cavity, but the fetus was floating around, with a good deal of meconium, and the intestines were considerably injected. In that case the uterus was removed and the patient made a good recovery.

I had a case last winter in the Woman's Hospital of very great interest and rather puzzling. This patient was 36 years of age and had been married a short time. I did a myomectomy for a fairly good-sized interstitial fibroid four years previously. Shortly after her marriage she went two months without menstruating and then one night she had severe pain and passed a good deal of blood. I saw her the next day and found her in good condition. The uterus was slightly enlarged, the cervix was closed, and I thought she probably had had a miscarriage and that it had all come away.

It was believed that the ovum was expelled. Two or three days later she had another hemorrhage and was sent to the Woman's Hospital. She was curetted and under careful examination I could not find anything in the tubes. There was nothing in the uterine cavity. The uterus was a little irregular, although I thought that that might be due to the former operation. I believed that we had to deal with an interstitial pregnancy. She went along for a day or two without any symptoms and then had severe colicky pains. I thought she had an interstitial pregnancy, as the symptoms could not be explained in any other way. The patient was finally opened up. There was no free blood in the peritoneal cavity. On the left side of the uterus there was a slight bulging not much larger than a walnut and on incising the uterine wall at this point a little ovum was extruded. The rent in the uterus was sutured, the patient made a good recovery and has been perfectly well since.

DR. DOUGAL BISSELL.—The case related by Dr. Brettauer reminds me of the only case of interstitial pregnancy which I have seen. Its history was identical to that related by the doctor and my experience during the operation was similar to his. I am not able to tell you exactly the duration of the pregnancy, but it could hardly have been more than six weeks. The patient entered the hospital in an absolutely exsanguinated condition. There was but one thing to do, and that was to operate immediately. The abdomen was very much distended from the quantity of blood it contained. On opening the abdomen we hastily removed a very large quantity of blood clots. My examination of the pelvic organs surprised me, as I found no rupture of the tubes, and was at a loss to know the origin of the hemorrhage. A little blood clot on the fundus of the uterus about half an inch above the left tube, was wiped away and a small rent in the uterine tissue was disclosed. My first thought was that an instrument had penetrated the uterus, as this rent was just about large enough for a sound to pass. A diagnosis of ectopic was made positive



when a very small fetus was discovered by Dr. Strong, the pathologist, in one of the numerous blood clots removed. The opening in the uterus was so small that all I needed to do was to put in a figure of eight stitch. The hemorrhage had ceased before the operation and the operation was only necessary to remove the great quantity of blood present and relieve nature of the necessity of taking care of so great an amount.

DR. L. W. STRONG.—It is unwise to draw conclusions as to the age of the pregnancy from the size of the fetus, because very frequently it is a stunted, pathologic fetus, and dead.

DR. E. C. SAVIDGE.—I would like to ask whether transfusion is done in these cases, and if so, whether or not it is done before operation and at what limit of red cell count and hemoglobin percentage.

DR. HERMANN GRAD.—I was rather surprised to hear Dr. Gibson say that from the statistics interstitial pregnancy is so rare, because in 53 cases I have had two cases of interstitial pregnancy, one about the fourth month and one much earlier. In both cases the collapse was complete. One case died on the table and the other one recovered. The rent was not very large in either. In the one at four and one-half months the fetus was found loose up under the liver. It was really surprising how a comparatively good sized fetus could escape through such a small opening.

In reference to blood transfusion, I might say I have had six cases of collapse where transfusion was done. My habit has been to begin the transfusion before the abdomen is opened and give the patient 200 c.c. before the incision is made, and while the operation is going on the transfusion is carried on and ended just before closing the abdomen. I might cite a very sad experience which I had the other day with blood transfusion in the Woman's Hospital. The patient was suffering with acute anemia with a hemoglobin of 25 or 26 and her red count was about 2,000,000. I decided to have a transfusion done and got possibly the best man in the city to do it. He examined the blood of both the donor and the recipient and had found a proper donor. He had given about 800 c.c. of blood when the patient said she felt a little short of breath, but he didn't seem to pay any attention to that, which rather surprised me. He put in 200 c.c. more of blood and then the patient became blue and died in fourteen minutes. The doctor told me that this was the second experience he had had where death occurred where the blood was absolutely compatible. It occurred to me while I was watching the patient that it was a case of anaphylaxis, and I understand that the Mayos have published an article in which they claim that the donor should be starved for twenty-four hours before blood is taken from him, because if he has had a large amount of protein circulating in his blood he might give an anaphylactic reaction to the recipient. I think we should all bear this in mind. This donor had had a very good dinner shortly before the blood was taken and after he had fasted all day.

DR. I. C. RUBIN.—I would like to ask Dr. Gibson if, in his search of the literature, he found any explanation given or offered for the occurrence of interstitial pregnancy. It occurs to me that the discussion this evening brought out the fact that rupture takes place at two stages, one of which we have an illustration in the present specimen and the other is one in which the nodule is very small, the case Dr. Vineberg reported, the case Dr. Brettauer reported and perhaps one other.

Now it is very possible that whereas we are dealing in this specimen with an essential interstitial pregnancy which ruptured at the third or fourth month, the other cases were rather ruptures of the isthmic portions of tubal pregnancies situated so near to the horn that they were mistaken for interstitial pregnancies. Indeed, it may be regarded as interstitial. As is well known, the intramural portion of the

tube is embedded in a parenchyma of the uterus where it is still pretty thick. The ovum could burrow into this parenchyma thinning it out and expanding as it continues to grow for three or four months. The uterine musculature tolerates this distention much better and to a greater degree than can the tube. The blood vessels are eroded causing hemorrhage and rupture much later than these occur in the case of the tube. On the other hand, when you come to the beginning of the isthmial portion of the tube you have a very thin affair. Of course, in either case you must have a mechanical obstruction at the uterine end to the course of the ovum.

Now, it is possible that in some of these cases the obstruction is due to the pathologic condition of salpingitis isthmica nodosa. This, if you remember, is ordinarily at the horn of the uterus, occupying a site very close to the interstitial portion of the tube.

I am reminded in this connection of a case which Dr. Charles Goodman, of this city, operated, in which the clinical history was similar to that in Dr. Gibson's case. Dr. Goodman was forced to remove the uterus and could not decipher the specimen. It took me some time to study it and analyze it and finally I thought I had succeeded and still think I succeeded in demonstrating a genuine cervical placentation. In that case the cervix behaved exactly as the intramural portion of the tube. Having sufficient thickness it made way for the expanding ovum until it reached the stage of the fourth month. Then impinging upon the pelvic parieties while the cervical wall became very thin, it finally ruptured. The report of this case was published in *Surgery, Gynecology and Obstetrics* in 1911.

DR. F. R. OASTLER.—I presented to the society two cases of this kind in the last fourteen months. I think I presented three cases altogether to the society since I have been a member, all of which were admitted as such. Two of these cases of interstitial pregnancy ranged around two months. The rupture was close to the cornu in each case. The openings were very small and unless one was very careful one was apt to miss them. The other case was at five and a half months and the fetus was delivered into the abdominal cavity with the placenta plugging the opening.

I learned three lessons from these cases. One lesson was that there are certain cases of ectopic that you must operate on whether you like it or not. In other words, you have to operate on all ectopics because you don't know whether you have an interstitial pregnancy to deal with or not. Some have said it is a good plan not to operate on ectopics, but nevertheless you must operate on all of them. One of my cases died before I could operate, while she was being infused. The second one died shortly after I began to operate. That was the one that was between five and six months' pregnant. These deaths were due to hemorrhage and shock. The third case fortunately got well. The first lesson I learned was to operate on all ectopics. The second lesson I learned was that interstitial ectopics bleed much more severely and much more rapidly than other forms of ectopic gestation; and the third lesson I learned was that it is not always necessary to do a hysterectomy. In the third case I removed one-third of the uterus and sewed the rent together and the patient got perfectly well and has had no further trouble.

One question I would like to ask Dr. Gibson. He said he made a red cell count. Did you make a white cell count too? It is important to make a white cell count as well as a red cell count, because as the red cells go down, the white cells go up.

DR. GIBSON (closing).—Dr. Brettauer spoke about the severe hemorrhage. We have another specimen in the museum of an early interstitial pregnancy. The woman had a hemorrhage in the bath tub and died. The opening in that case was small, about the size of the end of a lead pencil.

Dr. Bissell spoke about the early cases. The important point to bear in mind is this: the time of rupture depends entirely on the location or the implantation of the ovum. If it is near the outside of the cornu, it is going to rupture early. If it is in the middle, it will take longer. If it is near the entrance of the tube, it will probably rupture into the uterus. So the time depends purely and simply on where the thing is located, and the early cases do bleed much more than the later ones. Why that should be I do not know.

With reference to Dr. Savidge's remarks on transfusion: we have an arbitrary rule to transfuse when the hemoglobin is about 30. We were ready to transfuse this patient, but were unable to get any of her relatives to give up their blood. In twenty-four hours she was very much better. I think Dr. Grad's case died because she was given too much blood. We now give 250 to 300 c.c. at a time, which is better with a damaged circulation than putting in a large amount of fluid. That has been our experience.

Dr. Rubin spoke about why these pregnancies locate in the interstitial part of the tube. Bell, I think, has the best description of why ectopics occur primarily. He rather scouts the idea that it has anything to do with previous salpingitis. I believe if you go over all your cases you will find they are pure accidents. Bell's idea is that as trophoblastic action begins motion ceases. As soon as the syncytium begins to develop trophoblastic action, there the ovum will stop and it is simply a question of time.

Hysterectomy I think depends on individual conditions. In an early case you could easily take out a wedge-shaped piece of the cornu of the uterus. At first we thought we had a fibroid to deal with and when we got in the abdomen she was not in any shape to debate very much. It was a question of getting in and getting out as quickly as possible.

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NEW YORK ACADEMY OF MEDICINE.  
SECTION ON OBSTETRICS AND GYNECOLOGY.  
STATED MEETING, OCTOBER 26, 1920.

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THE CHAIRMAN, DR. HAROLD C. BAILEY, PRESIDING.

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DR. JAMES F. GRATTAN reported a case of **Pudendal Hernia, Operated by the Abdominal Route.**

This patient, a woman fifty-three years of age, applied in July, 1918, for the relief of a condition which she described as "irritation in the rectum with difficulty in moving the bowels," and in addition a "bearing down sensation in the vagina," ascribed by two physicians who had examined her within the year to "falling of the womb." The rectal trouble was further described as "a desire to empty the bowels, often quite urgent, but without result except with the aid of an enema." With the examining fingers in the vagina, an impulse was felt against the back of the hand, especially in the adductor region of the left thigh. A mass the size of a hen's egg developed at the site of the impulse, which was soft, and reducible, and external to the left labium majus, but not involving that part. At operation a suprapubic incision extending from the symphysis to the umbilicus was necessary on account of the extremely fat abdominal wall. Exposure of the pelvic organs was difficult, but was finally accomplished and revealed descent of the sigmoid loop through a triangular opening in the floor of the pelvis. This opening was bounded anteriorly by the posterior reflection of the broad ligament, mesially by the lower segment of the uterus



and the left uterosacral ligament, laterally and posteriorly by the rectum. The sigmoid being fixed at its point of continuation into the rectum, appeared to slide down along the posterior surface of the broad ligament and disappeared into the hernial opening, practically the entire loop being out of view. There were no surface adhesions and no evidences of constriction at any point. Gentle traction brought the sigmoid loop out of the sac. There was no process of the sac descending into the left labium as in the cases of "pudendal" hernia reviewed by Moscheowitz. However, the exit and course of the descent in this case was undoubtedly the same, the final destination being the subcutaneous tissue of the upper adductor region of the thigh rather than the labium. The protrusion undoubtedly occurred through the levator muscle and passed through the triangle bounded externally by the ischio cavernosus, internally by the constrictor cunei and posteriorly by the transversus perinei, along the left lateral wall of the vagina, emerging in the thigh. The split in the levator was probably the result of the difficult twin labor mentioned in the history. No attempt was made to extirpate the sac. Its depth, the adipose status of the patient, her age precluded the prolongation of the anesthesia needlessly. Five or six mattress sutures of double Pagenstecher linen were placed across the long arm of the triangle thus closing it tightly and completely. A continuous suture was then whipped over the line of the mattress suture, taking another reef in the broad ligament. This last step caused a version of the uterus backward and to the left, superimposing the fundus over the site of the hernial opening. The sigmoid was anchored to the left psoas muscle at the brim of the pelvis and about two inches above that point, the idea being to prevent a descent to its habitual location in the vicinity of the hernial opening. The abdomen was closed in the usual way. The patient made an uneventful recovery and remained free from recurrence during the two years that she was under observation.

This case is published as one of pudendal hernia because I feel sure that its exit corresponds to the cases of pudendal hernia described by Cooper in his volume on Hernia published in 1807 and to the cases collected under the heading of pudendal hernia by Von Winckel in 1881, and reviewed by Moscheowitz in his paper referred to above, in which 11 authentic cases were listed. Moscheowitz doubts the occurrence of this type of hernia in the male and questions whether it is a fallacy to name this hernia for its destination (the vulva) rather than for its point of exit in the pelvic floor. The present case demonstrates this fallacy because the destination of the sac happened to be the adductor region of the thigh rather than the pudendum. Dr. J. A. Blake suggested the term "levator" hernia. However, I do not feel justified in making a new classification for a hernia the course and surgical anatomy of which was essentially the same as the cases described under the term "pudendal" hernia. According to Moscheowitz no case of "cure" of this type of hernia is recorded. This patient has been two years without recurrence during which period she has been performing all the heavy work of her household.

#### DISCUSSION

DR. WILLIAM P. HEALY.—The condition is so rare that few of us see a hernia at the vaginolabial base. Such a hernia may come out anteriorly or posteriorly appearing in the labial crease. When this occurs, the hernia is likely to be looked upon as a rectocele instead of a true vaginolabial hernia. One occasionally meets such a case in which a colporrhaphy and plastic operation is done, but not being a true rectocele the hernia is not reduced and goes through the culdesac of Douglas and out over the repaired pelvic floor. The best way to deal with these cases is to operate on them from the abdominal side. If possible reduce the sac. Having turned the sac inside out into the peritoneal cavity, excise it. You can then obliterate the hole and

reinforce the neck of the sac with such structures as are near by. There need be no fear of these hernias undergoing obstruction or strangulation for most of them have very free access into and out of the hernial canal.

DR. HAROLD BAILEY.—It is difficult to discuss pudendal hernia, there being only 12 cases reported during recent times. I think the point Dr. Grattan makes about the name is very important. If the cases of true pudendal hernia are those that rupture into the vaginolabial fold, it seems to me it would be well to differentiate between this type of hernia and one such as Dr. Grattan has described, which gradually comes down into the adductor region of the thigh.

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DR. HERBERT C. CHASE reported a case of **Right Tubal Pregnancy of the Fourth Month with Rupture into the Cecum.**

This case is presented because of the clear sequence of events which lead to a fairly easy diagnosis and, because I believe the condition to be exceedingly rare, as I can find nowhere in the literature its exact duplicate. This patient, twenty-five years of age, began bleeding on May 4, after missing February, March, and April. The flow was scant and accompanied by no pain and no clots. On June 20 she began vomiting and experienced knife-like pains in the left lower quadrant of the abdomen. The pain continued until August 7, when on rising she felt a strong desire to evacuate the bowels. Several efforts were made with no result until midnight of the same day when she passed *per rectum* a large amount of dark clotted and bright red blood. During the following two days small dark clots and bright fluid were passed *per rectum*; then it ceased. From this time until her admission to the hospital on August 14 she had no pain but was very weak and much of the time did not know what was going on about her. When examined on August 14, she was pallid, thin, emaciated, her lips were colorless, pulse thready, heart sounds weak, with a soft systolic murmur at the apex. The abdomen was flat and soft, there being no rigidity or tenderness. A mass the size of a fist and easily palpable was felt in the right side of the pelvis. Vaginal examination showed no vaginal bleeding; the uterus was normal in size and position; the left adnexa were negative; the mass on the right side could be palpated. The patient was at once given an infusion of 500 c.c. of saline and brought by ambulance to the Woman's Hospital, arriving at 1 A. M. Here she was given a direct blood transfusion, following which the hemoglobin which had been 21 per cent rose to 35 per cent, and the red blood corpuscles from 1,344,000 to 1,816,000. She had lost no more blood and at 8:30 A. M. seemed better. The pulse, which on her arrival at the hospital was 144 had dropped to 130, and we decided to open the abdomen. A median, vertical, suprapubic incision was made. There was no bleeding or fecal contents, or any soiling of the peritoneal cavity when it was opened. The omentum and several loops of the intestines were adherent to the posterior surface of the right tubal mass. Two loops of small gut and the omentum separated easily. The cecum was adherent to the posterior surface of the ruptured ectopic and when it was separated a hole in the gut wall the size of a silver dollar was seen. The lumen of the gut was filled with a large round clot, the size of an English walnut, which filled the annular opening and was adherent to the posterior surface of the ectopic mass. When this clot was lifted, the fetus lay in the cecum. There was no other rupture and no blood in the culdesac or pelvis. The remainder of the large intestine from the cecum to the sigmoid was filled with blood clots. The rent in the cecum was repaired with a continuous suture of zero chromic catgut for the mucosa and a continuous (Lembert) suture of fine Pagenstecher thread for the serosa. The ectopic mass was then quickly removed after ligation of the blood vessels and a posterior vaginal drain of one inch iodoform gauze introduced through the vagina from above. During the operation

which required 40 minutes the patient was given 500 c.c. of glucose solution into the vein. She reacted well after the operation. On the fourth day postoperative she was given another direct transfusion, after which she gained rapidly and was out of bed on the fourteenth day, walked on the seventeenth day and went home on the twenty-first. On October 17, her blood pressure was 112, hemoglobin 58 per cent and her color and general condition improved so that she could do her own housework. The pelvic examination was negative.

The pathologic report was presented describing the specimen. Microscopically one section showed a blood clot and portion of the tubal wall considerably inflamed. The blood clot showed a delicate membrane, apparently amnion. Other sections showed abundant trophoblasts.

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DR. HERMANN GRAD, of New York City, presented **An Analysis of Fifty Cases of Ectopic Gestation.** (For original article, see p. 360.)

#### DISCUSSION ON DR. CHASE'S CASE AND DR. GRAD'S PAPER

DR. FRANK R. OASTLER.—I have had the privilege of seeing 150 cases of ectopic, the last this afternoon. I have been interested in comparing the report which I published in 1917 in *Surgery, Gynecology and Obstetrics*, in which 109 cases were reported, which I had operated upon up to that time. Dr. Grad called attention to the fact that ectopic gestation is really a subacute disease. Out of the 109 cases which I reported only 15 cases were of the pyrotechnic or explosive variety. The disease is for the most part subacute and not acute. It must be differentiated from salpingitis. We were formerly taught that ectopic gestation was an acute condition and that we should expect to find the patient in a faint, collapsed and exsanguinated and with a thready pulse. It is the exception, not the rule, to find the patient presenting these symptoms. Another point upon which Dr. Grad's experience coincides with mine is that ectopic gestation occurs the same number of times on the right as on the left side. When one considers the etiology of ectopic gestation, a common cause is stated to be inflammatory disease. Inflammatory disease occurs oftener on the left side than on the right side. If it is true that ectopic gestation occurs equally as often on one side as on the other, inflammatory disease may be a cause of ectopic gestation but it cannot be the only cause.

Dr. Grad divides his cases into four groups, the mild, the severe, those with collapse and those with syncope. I have not been able to divide my cases so accurately, but divide them into two groups the fulminating and the subacute. If one makes such a fine distinction the patient may leave us while we are making the differentiation. Dividing ectopic gestations into two groups, the fulminating and the subacute make differentiation much simpler.

Dr. Grad attributes fatalities to hemorrhage. I think they may be attributed to shock as well as to hemorrhage and I would remove the blood clots in the abdominal cavity as thoroughly as possible because I believe they create a danger if left in the abdomen in that they make convalescence much harder and recovery much slower. I think that nearly all our fatal cases are due to both hemorrhage and shock, but there is one class of ectopic gestations that is nearly always fatal and that is the interstitial variety. When one meets with the fulminating cases that die before they reach the operating table, it will be found that they are nearly all of the interstitial variety.

Another question is the advisability of operating upon every case immediately. If one feels that he has made a diagnosis of ectopic pregnancy, he should at least open the culdesac and if there is blood in the culdesac the operation should be completed either above or below as the case may be.



As to the question of salt solution and gum glucose, I am not yet converted to the idea that salt solution is useless. Its action is not permanent and it may have to be repeated two or three times in order to sustain the patient. The injection of salt solution is a procedure of value for we must remember that we cannot always obtain blood for transfusion. Furthermore, a reaction may follow blood transfusion which may be sufficient to topple over a patient who is on the verge between life and death.

DR. LOUIS J. LADIN.—Dr. Grad's grouping is original and interesting, but I believe the only safe classification of tubal pregnancy is the division into two groups, —ruptured and unruptured. I cannot understand why a correct diagnosis was made only in twenty-five per cent of his series. This is certainly much too low. I desire to refer for a moment to a very valuable sign in the differential diagnosis of intra-uterine and extrauterine pregnancy. A positive sign of intrauterine pregnancy is the elastic area in the median line of the anterior wall of the uterus, to which I called attention in a paper read before this section in February, 1907. In uterine pregnancy the elastic area is always present, while on the other hand in extrauterine pregnancy the elastic area is absent. We have here a means of eliminating a most prolific source of error in the diagnosis of tubal pregnancy.

As regards treatment: After all that has been said and written on the subject, it is indeed surprising to find an advocate of delayed operation, especially in this city where transportation and access to a hospital can be obtained at a minimum loss of time.

My experience consists of a series of over three hundred operations for extrauterine pregnancy, a large number of them being of the tragic type where immediate operation was the invariable rule. No case was refused operation as long as there was a cardiac beat and in several cases I operated while the patient was unconscious and required no anesthesia. There were four deaths in this series due to complications and not to shock and hemorrhage.

In view of these experiences, I have no hesitancy in saying that if the fatal cases reported by Dr. Grad had been operated on immediately upon arrival at the hospital, and infused or transfused afterwards instead of being infused or transfused while delaying the operation, the result would have been different. I cannot emphasize the fact too strongly that shock, no matter how severe it may be, is no contraindication to immediate operation. Saline infusion should be employed either at the time, or after the abdomen is opened to check the bleeding. I have never had occasion to give a transfusion for hemorrhage from ruptured tubal pregnancy.

It is generally admitted now that patients die of hemorrhages due to ruptured tubal pregnancy, and I have seen one death caused by delayed operation. This patient collapsed in my office after examination, and instead of sending for an ambulance at once, I waited for an hour or so before doing so. I had the patient transferred to a hospital nearest to my office where she died on the operating table. This patient's life could have been saved if she had been transferred to the hospital when she collapsed in the office.

Subsequent to that experience I had four other patients collapse in my office with internal hemorrhage due to ruptured tubal pregnancy, and having learned my lesson, each one was transferred at once to a hospital for immediate operation, and they all recovered.

It is my practice to remove all the clots from the abdomen, and as much as possible of the fluid blood. Clots may become infected, give rise to intestinal adhesions and interfere with the smoothness of the convalescence. Shock and the rapidity of recovery after operation depended not so much upon the amount of blood lost as upon the time the hemorrhage was allowed to continue. The earlier the operation after rupture, the more rapid the recovery, regardless of the amount and severity of the

hemorrhage. The best and only rule to follow in these tragic cases is to place the patient on the table as quickly as possible and then do an infusion or a transfusion.

DR. BAILEY.—I hope the question as to the advisability of immediate operation, when the patient is in shock will be discussed. Under the conditions met in the war zone, as I understand, in the cases injured at the front it was found that the mortality was much lessened, if measures were instituted to combat shock before an operation was entered into.

DR. EDWARD WALLACE LEE.—I would like to speak first of Dr. Chase's case of ectopic gestation in connection with rupture into the intestine. Several years ago I was called to see a patient in a hospital on account of a fibroid tumor which was growing rapidly. One of the features of this case was that the woman was having bloody discharges from the bowels, and the peculiar feature was that the blood was generally in clots that looked like old clots. The patient was 45 years of age and the tumor was about the size of a six months' pregnancy. Vaginal examination showed fullness in the culdesac. A sound passed into the uterus showed the uterus of normal depth. I could not decide upon the diagnosis, but proceeded to open the abdomen. I found an immense organized clot of blood but no membranes. I broke it off piece by piece until I cleaned out the entire clot. A portion of this clot seemed to run into the intestinal canal. It had evidently ulcerated through into the bowel. Further proof of this seemed to be offered by the fact that when the large clot was cleaned away from the intestine the smell of gas from the bowels was very perceptible. I could not find the opening into the intestinal tract and I did not look long for it, but drained and packed the wound and sewed up the abdomen. A fecal fistula resulted which persisted for about six weeks and then closed. The patient's recovery was otherwise uncomplicated. That was evidently a tubal pregnancy which had ruptured into the intestinal tract.

DR. HIRAM N. VINEBERG.—I recall a case of ectopic with hemorrhage from the bowel. It occurred in a case in which the pregnancy had formed in the small stump of a tube, following a salpingectomy for a pyosalpinx some time before. The ovalur sac was enclosed in part by a portion of the sigmoid. At the operation I could not find any opening in the bowel. Evidently the villi had eroded the wall of the intestine sufficiently to produce bleeding, but not enough to cause a defect perceptible to the naked eye.

Regarding Dr. Grad's clinical classification of ectopic pregnancies, it may work satisfactorily for many cases, but a case with negligible intraperitoneal hemorrhage today may have a fresh effusion of blood into the peritoneal cavity during the night and tomorrow belong to one of the other groups.

It is sometimes difficult to differentiate between the syncope due to the shock, caused by the impact upon the peritoneum of a moderate amount of blood and that due to very copious effusion of blood such as occurs in the class of cases grouped by the reader of the paper as fatal, and designated by me as cataclysmic and by others as tragic, etc.

I have found the following a good working rule. In the moderate effusions an intravenous saline injection will bring about a prompt improvement which will be maintained; in the other group, there may be a slight improvement in the pulse at first but it soon disappears. The latter group (the cataclysmic) is exceedingly treacherous.

In one case in which I was curetting a woman in her home and was not provided with instruments for an extensive operation, I opened the abdomen with scissors, stopped the hemorrhage and the patient recovered. When patients are in a desperate condition, I would not transport them, but would operate at once even in bed. If

a person cut the femoral artery one would not think of giving him saline or gum acacia and glucose solution. If you are going to save your patient you cannot wait for transportation or blood transfusion.

I wish also to corroborate the statement of Dr. Oastler and Dr. Ladin in reference to salt solution; it has helped me out in these very desperate cases. When the bleeding has stopped salt solution is a great help. If possible blood clots should be removed; it is not a good thing to leave them.

DR. MEYER R. ROBINSON.—I wish to compliment Dr. Grad for his frankness in stating that in 25 per cent of his cases he failed to make a diagnosis. The experienced clinician will readily understand this apparently large percentage of mistaken diagnoses. While the acute, fulminant or tragic cases of ruptured tubal pregnancy present but slight diagnostic difficulties, the chronic case will frequently test the diagnostic acumen of the most astute gynecologist. I am sure that most of the diagnostic errors in Dr. Grad's series occurred in the latter group. Since the question of differential diagnosis was not taken up by the reader I shall refrain from discussing this phase of the problem, and shall limit my remarks to the question of when to operate and when not to operate in cases of ruptured tubal pregnancy.

At the Beth Israel Hospital where the number of ectopic gestations operated upon exceeds that of any other hospital in the city, we recognize only one contraindication to operative procedure in a case of ruptured tubal pregnancy, and that is, a dead patient. So long as the precordial heart sounds are audible, and respiration is still present, we operate, and not until sounder physiologic facts and better operative results are offered by those who wait for the symptoms of shock to subside before they resort to operative treatment, shall we deviate from our rule of immediate operation.

Why shall intraabdominal hemorrhage due to ruptured tubal pregnancy be treated differently from intraabdominal hemorrhage due to other pathologic causes? Does a surgeon hesitate to stop hemorrhage as soon as diagnosed, and why should the gynecologist?

If shock is the deterrent factor which stays the hand of some gynecologists from carrying out life saving operation, then why resort to other means first instead of at once removing the causes of shock, which in this instance are the hemorrhage and the peritoneal irritation by the foreign body, the free and the clotted blood.

As to time of transfusion, I also take a very decided exception to the views of the reader. No intravenous infusion, whether saline, glucose or bicarbonate solutions or whole blood should be given before the bleeding point is secured. Nature in her effort to save the bleeding patient from exsanguination, slows the heart action, diminishes the rate of the blood flow and with the fibrin ferment formed as soon as blood is spilled, produces clotting. The introduction of fluids into the veins stimulates the heart, increases the rapidity of the blood current, retards clotting, and thus thwarts Nature's effort to keep the bleeding point plugged. Intravenous infusion in these cases is life-giving and life-saving if done after the bleeding has been stopped.

DR. GRAD.—The case of Dr. Chase recalls to my mind a similar condition. The patient began to bleed from the rectum before there were any symptoms of ectopic gestation. The blood was sometimes dark, sometimes brighter. The ectopic had ruptured into the rectum. I found evidence of a large pelvic abscess. The culdesac was opened for drainage, and through the opening a small fetus was extruded.

DR. CHASE (in closing) said the point was brought out in the paper that the rupture was directly and primarily into the gut. There was no blood in the peritoneal cavity. Women were brought into the hospital where rupture had taken place into



the peritoneal cavity and was followed by sloughing of the membranes and infection which gave very definite symptoms, but here the entire tube became distended and ruptured into the intestine, so that every bit of blood was lost directly into the intestine and through the rectum.

DR. GRAD (in closing).—Just a few words in connection with Dr. Oastler's discussion as to the difference between collapse and syncope. This difference is not sharply drawn. When the patient presents the symptoms of collapse and the mind is clear, we call the condition collapse, but when there are waves of faintness during which the mind is not clear we call that condition syncope. In the latter I doubt whether we can save the patient whether we operate in the home or take the patient to the hospital. The question is can we do anything to save life? Can we put something into the circulation that will sustain the patient until we can get her to the hospital where we can get a donor and perform a transfusion and operate?

There is a difference between the shock of an ectopic pregnancy and that on the battlefield. In dealing with ectopic pregnancy one must treat the condition of collapse. These patients die while they are being transported to the hospital. If we can introduce the glucose and gum solution we may save some of these cases.

I made a different classification of ectopic pregnancies from that in general use because I felt that we have not dealt with them as efficiently as we should have done. The cases Dr. Ladin saved were cases with severe hemorrhage, and when severe hemorrhage occurs such cases should be operated upon, but the type of cases I am speaking of is that in which the patients are on the verge of death. Here the question is not to stop bleeding, for that has already stopped, but to bring the patient into a state in which she can be operated upon.

There has been some difference of opinion in regard to the removal of blood clots in the abdomen. I always remove as much of the blood as possible in an expeditious manner, but I feel that the blood clot will not do as much harm as prolonging the operation. It may cause a rise of temperature but it does not delay recovery.

DR. LEE.—Do you think that blood left in the abdominal cavity is of any benefit to the patient?

DR. GRAD.—The blood left in the abdominal cavity is absorbed too slowly to do any good, but I think we do more damage by keeping the abdomen open longer to clean out the blood clots than we do by leaving some in.

The question is, when called into consultation in these cases that are usually fatal and where we are practically helpless, what are we to do? Is there nothing to do but what we have been doing?

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### DR. HENRY DAWSON FURNISS described **A New Method of Vesical Anesthesia.**

Anesthesia for cystoscopic examinations and operative treatment of the bladder, aside from that obtained by general inhalation anesthesia or nerve blocking, as in sacral, epidural and spinal, has been most unsatisfactory. Local anesthesia obtained by the injection of drugs in solution is seldom sufficient for most of the conditions necessitating intravesical operations. Cocaine, the most efficacious of the anesthetic drugs, is unfortunately the most toxic. Some months ago Howard Lindeman read a paper on the treatment of trigonitis by the injection of the trigonum with a solution of urea and quinine hydrochloride, and exhibited a long needle that could be passed through a cystoscope to accomplish this purpose. In the discussion of Dr. Lindeman's paper I advocated the use of this instrument for the injection of anesthetic

solutions into the base of ulcers to be cauterized, and also into the pedicles of papillomata to be fulgurated. Later it occurred to me that in women the same result might be obtained by a more simple method, namely, infiltration of the vesicovaginal septum from the vaginal side. This method was, of course, applicable only to favorably situated lesions.

Almost any portion of the vesical wall can be infiltrated by one or both of these methods, although I would hesitate to infiltrate that portion of the bladder wall covered by peritoneum; yet in the absence of infection, even this portion might be safely and successfully anesthetized.

I have recently had opportunity to operate upon three patients under infiltration anesthesia. Two had papillomata of the region of the ureteral orifice, and one had an ulcer over the trigonum. The two papillomata cases were successfully fulgurated with very little discomfort after infiltrating the portion of the vesicovaginal septum that underlay the growth. In the ulcer case, cauterization with fused nitrate of silver was done almost painlessly. Previously I had cauterized the ulcer after having attempted to anesthetize the bladder by the instillation of 4 per cent eucaine solution, but the procedure caused a great amount of pain. In each of these cases a half per cent solution of novocaine with adrenalin was used, the amount varying from 5 to 10 c.c. It is essential to have a tightly fitting plunger to the syringe, as otherwise there will be a back leakage and failure to deposit the solution in the tissues. The syringe used by dentists for the infiltration of gums works admirably.

Thus far I have used this method in only the cases mentioned, but with each one the result was eminently satisfactory. I see no reason why the whole mass of the bladder, or any portion of it, cannot be anesthetized, and any operation that can be done under general anesthesia (where the element of relaxation is not essential) may be performed. In none of these cases was any untoward result noted.

#### DISCUSSION

DR. HOWARD E. LINDEMAN.—I have been much interested in what Dr. Furniss says, in that I think, that for the purpose he mentions, his method is much simpler than the one I have been using in the treatment of trigonitis. But my object is not to obtain anesthesia. In trigonitis the outstanding feature is the congestion, hypertrophy and hyperplasia of the subepithelial blood vessels, and I attempt to cause a destruction or at least a constriction and compression of these vessels. Knowing that quinine and urea solution when injected in the tissues for the production of local anesthesia causes a deposit of fibrin and a considerable induration at the point of injection, I decided to employ this in the treatment of trigonitis, avoiding necrosis. I have never made the injection from the vaginal side, but believe this could be done by having a cystoscope in the bladder at the same time to watch the point of the needle and control its location, and see that the point does not come through the mucous membrane, because one wishes to deposit the solution in the submucous tissues. It might be simpler to give the treatment in this way, because it is not an easy procedure through the cystoscope and takes considerable time; to cover an area the width of the trigone and for a distance of one-half inch from before backward takes one-half hour or more, but I believe it would be more difficult to localize the injection in the trigone unless a cystoscope were used coincidentally in the bladder to control the site of injection.

# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### The Views of Primitive Peoples Concerning Menstruation

(A Review of Literature)

BY JONATHAN WRIGHT, M.D., PLEASANTVILLE, N. Y.

**A**MONG all primitive nations, including the ancient Hebrews, we find an elaborate code of rules in regard to the conduct and treatment of women on arriving at the age of puberty, during pregnancy and the menstrual periods, and at childbirth. Among the Cherokees the presence of a woman under any of these conditions, or even the presence of any one who has come from a house where such a woman resides, is considered to neutralize all the effects of the doctor's treatment. For this reason all women, excepting those of the household, are excluded. A man is forbidden to enter, because he may have had intercourse with a tabooed woman, or may have come in contact with her in some other way; and children also are shut out, because they may have come from a cabin where dwells a woman subject to exclusion.

Among the Assiniboine, two taboos are still rigorously enforced. A menstruating woman must not step over any one's legs or body, and a certain medicine bundle must not be kept in the same lodge with her. If a woman menstruates, she immediately tells her husband, who then places the bundle outside his tent. If she is approaching a lodge and does not know whether a medicine bundle is kept inside, she pauses at the door to inform the inmates of her condition, so that the medicine can be removed. It is said that if the bundle were not taken out, a woman would continue to menstruate indefinitely.<sup>1</sup> In the social life of the Blackfoot Indians, "there is no special taboo upon a menstruating woman requiring her to live apart but she is not supposed to come near the sick. The belief is that in such a case something would strike the patient 'like a bullet and make him worse.' Further, at this time women are supposed to keep away from places where medicines are at work. These restrictions also apply to immediate associations with men and to women lax in virtue."<sup>2</sup> Among the Crow Indians the only regulation that seems to persist is that menstruating women must not come near medicine bundles. These must be removed from the lodge until she recovers. In former times the women were obliged to ride inferior horses when in this condition, and were not permitted to approach a wounded man or warriors setting out on a war party.<sup>3</sup>

Among the Thompson and the Ten'a<sup>4</sup> Indians the only fresh meat she could eat was that of the female mountain-sheep. Among the Arapaho, "women do not spend several days in solitude during men-



stration as is the case among the Sioux, the Utes, and many other neighboring tribes. They sit quietly, keeping away from other people, especially from women and young men, but they eat with other people, and cook for them. They wrap their clothes tightly about the waist, they change their clothes every day, and wash themselves. There is no practice or ceremony connected with a girl's first menstruation. The menstruating woman is not allowed to enter the mesal tent, and if a man who has had intercourse with a menstruating woman takes part in this ceremony, he is found out by the smell. Sickly people and menstruating women are not allowed to enter a tent in which there is a sick person; the smell of the discharge would enter the body of the patient and make him worse. A woman just delivered also refrains from going into the tent of a sick person. Medicine-women after delivery go into the sweat-house, the steam-bath, to cleanse themselves."<sup>5</sup>

It is probable that some of the taboos imposed upon menstruating women or men who have had commerce with them have their origin in the odor, as for instance in hunting; not only by lustration, but, as Dr. Goddard has told me, by smoke of fragrant herbs such men must purify themselves before going on the hunt. This allows the conjecture that experience taught the hunter, skilled in getting to leeward of the game, that the scent puts them at disadvantage. It is only occasionally, however, that one gets a hint which suggests a rational explanation of a taboo of primitive man.

Speaking of the isolation of woman during menstruation, among the Indian tribes of the United States, Schoolcraft<sup>6</sup> says: "The temporary abstraction of the female is always known to the lodge-circle. The lodge of separation is generally made of branches, rolls of bark, and light materials. In the summer, nothing further is demanded, and no fire is required. When the weather renders a fire desirable, a very small one is lighted from dry sticks. The amusement of the inmate, in the interval, is to prepare flags for mats, to pick up sticks for fire, or other light labors. The leading idea evinced by the custom is that of a deeply seated superstitious fear or dread of contact with any person within the camp. Everything which is touched by her hands during this period, is deemed ceremoniously unclean. She takes with her, in her seclusion, a spoon, a dish, and a small axe. If her step crosses the path of a hunter or warrior, it communicates a talismanic influence—the magical and medical charms of his pursuits are destroyed—the secret power of the Meda has been counteracted—in fine, his panoply of medaic and totemic influence is, for the time, paralyzed. The warrior's luck has been crossed for that day. Merely to touch a cup, with the marks of uncleanness, is equally malign. This superstition does not alone exert a malign influence, or spell on the human species, its ominous power, or charm, is equally effective on the animal creation, at least on those species which are known to depredate on their little fields and gardens. To cast a protective spell around these and secure the fields against vermin, insects, the sciurus and other species, as well as to protect the crops against blight, the mother of the family chooses a suitable hour at night, when the children are at rest and the sky is overcast, and having completely divested herself of her garments, trails her machecota behind her, and performs the circuit of the little field."

The information being copious from which to select, in regard to the North American Indians, though less so for other continents, nevertheless it is sufficiently recorded to demonstrate the prevalence of primitive thought on the subject in independent ethnic centers. Bosman<sup>7</sup> said of Africa: "Menstruous women are here deemed so unclean that they are not permitted so much as to enter their husbands' houses, or to touch anything, either to dress the domestic diet or clean the house, or indeed on any other account; nor are they permitted so much as to look into, much less enter several houses, but, during this natural uncleanness, are obliged to reside in a separate house, though, as soon as that is over and they have washed themselves, they are restored to their former state." They disclaimed knowledge of any reason for the custom, but said it was traditional with them. Of Australia, Howitt<sup>8</sup> says: "There is a regulation relating to camps in the Wakelbura tribe which forbids the women coming into the encampment by the same path as the men. Any violation of this rule would in a large camp be punished with death. The reason for this is the dread with which they regard the menstrual period of women. During such a time, a woman is kept entirely away from the camp, half a mile at least. A woman in such a condition has boughs of some tree of her totem tied round her loins, and is constantly watched and guarded, for it is thought that should any male be so unfortunate as to see a woman in such a condition, he would die. If such a woman were to let herself be seen by a man, she would probably be put to death. When the woman has recovered, she is painted red and white, her head covered with feathers, and returns to the camp." Lumholtz<sup>9</sup> confirms this, saying: "As far as I know, the Australians everywhere regard their women as unclean in such circumstances. In some parts of the continent they are isolated in huts by themselves, and no one will touch a dish which they use; among other tribes a woman in this condition is not permitted to walk over the net which the men are making." As we shall see, these ideas to a considerable degree associated themselves somewhat with the idea of the process of parturition and the postpartum period,—in many tribes extended to the end of lactation which was itself much prolonged.\*

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\*To be continued.

## Selected Abstracts

### Indications and Prognosis of Abdominal Cesarean Section

**Applegate: The Indications for Cesarean Section.** American Journal of Obstetrics, 1919, lxxx, 167.

The author bases on a critical analysis of a series of 95 Cesarean sections the following deductions in regard to indications: A previous Cesarean is always an indication for Cesarean section in the event of subsequent pregnancies. Eclampsia in itself is not an indication. The operation becomes justifiable in the presence of complicating dystocic factors such as rigid and undilatable cervix and pelvic contraction, or a deformity, and when the traumatism and exhaustion of forcible delivery would be greater than the shock from an abdominal section. Placenta previa represents an indication only in complication with a dystocic factor, or in a case of placenta previa centralis when the child is viable. In regard to disproportion the author still adheres to the well-established rule that if there remains any doubt concerning the possibility of delivery through the natural route, the patient must be given the test of labor, but not to the point of exhaustion. In spite of all advance, abdominal Cesarean section still is a major operation attended by some danger.

**Emerson: Cesarean Section.** Boston Medical and Surgical Journal, 1920, clxxxii, 272.

In this article a critical summary is given of a series of 120 abdominal Cesarean sections. In the writer's opinion, this procedure to-day is one of the most finished operations. It is so simple, so rapidly performed that it is practically without danger in competent hands. Even in instances in which the mother's death is inevitable, the child often will be saved.

The author seems justified in this estimation of the dangers by a loss of only three mothers in this series. This fact also might explain that we find in these 120 Cesarean sections the following, not commonly accepted, indications for Cesarean sections: albuminuria in 6 cases; breech presentation in 4; double vagina in 2; epilepsy in 1; occipito-posterior rotation in 2; suspension of fetus in utero by cord in 1; transverse presentation in 2; uterine inertia in 9 cases.

The writer advocates Cesarean section even for minor degrees of pelvic contraction. In cases of placenta previa all other methods should be discarded. Whenever placenta previa is diagnosed, Cesarean section should be the only method considered. Other cases, best treated by means of abdominal hysterotomy, are those in which there is inertia or atony, and malpositions of the fetus.

**Schumann: Cesarean Section. Its Indications and Limitations in the Obstetrics of To-day.** American Journal of Obstetrics, 1919, lxxix, 371.

The indications for the employment of this very radical method of terminating labor have become so broad and in certain hands are so loosely applied, that a careful critic of the indications and limitations of the procedure would seem to be in order.



The classical indication for the operation at term, for dystocia due to pelvic deformity, still holds good practically without modification, except that it now includes cases which formerly would have been delivered by high forceps.

The second common reason for the performance of Cesarean section is the development of a malposition. In the absence of pelvic anomalies in most cases of this sort version is the most advantageous method of delivery.

Abdominal delivery is almost invariably called for by uterine or vaginal neoplasms causing a dystocia. A difficult forceps might prove successful, but will increase the danger of necrosis and will leave the great probability of an abdominal operation in the future for the extirpation of the growth. In every case of this sort the obstetrician, before resorting to Cesarean, must be convinced that the tumor is a source of true obstruction. The mere presence of a uterine or ovarian new-growth does not constitute an indication.

Rigidity or true stenosis of the cervix rarely necessitates abdominal delivery.

Central placenta previa is an indication of the very first importance, and, from the standpoint of the mother, even more important than the indication for Cesarean in pathologic labor. If, however, labor is established, the cervix soft and dilatable, and the patient a multipara, even in this form of placenta previa either version or the use of the bag offer the most advantageous solution of the problem.

The ideal treatment of eclampsia demands rapid and general elimination of toxins together with an immediate delivery which causes the least possible traumatism to the patient. Plain indications for Cesarean then are presented in the presence of a toxemia not appreciably improved by vigorous eliminative treatment continued for a reasonable time (six to eight hours), the absence of active labor, the presence of a rigid, undilated cervix, usually noted in primiparae. Thus eclampsia constitutes a most important but strictly limited field for Cesarean section.

Such systemic diseases as pulmonary tuberculosis, endocarditis, etc., may rarely call for a section in the interest of the mother.

The foregoing statements relate entirely to abdominal hysterotomy deliberately selected as the most efficacious plan of terminating labor in the interest of both mother and child.

In other instances the performance of a section even under adverse conditions may become mandatory. In a case of premature detachment of the placenta the operation is done in the interest of the mother. In complete uterine rupture the laparotomy is required both for control of the hemorrhage, and for the removal of the fetus which usually has escaped into the abdominal cavity. In such occurrences no limitations or contraindications can be considered.

Of all classes of cases coming to the obstetrician for Cesarean section, the largest is the group, in which labor has proceeded far without recognition of the existing disproportion between pelvis and head, or in which a pathologic presentation had not been corrected early in labor when this would have been possible. Most of these patients have been repeatedly examined, possibly have been subjected to unsuccessful attempts of forcible delivery, are exhausted and probably infected. In many of these cases some variety of Cesarean section is followed by hysterectomy. In the determination of the proper treatment of each

individual case of this group the right of the unborn child, when still living, must be duly considered, but it must not be forgotten that the potential succeeding children also have certain rights. In the decision of such a puzzling problem there must be considered in order: the rights of the child about to be born, those of the parents (not the mother alone), and also the rights of the state with respect to the number and condition of children born to its citizens.

In the case of the dead fetus no indication for any form of abdominal delivery exists.

In general it might be said, that there are too many uteri sacrificed upon mere suspicion of infection. The teaching in this respect has been ultraconservative.

**Essen-Moeller: Results and Indications of Abdominal Cesarean Section.** Archives mensuelles d'obstétrique et de gynécologie, 1919, viii, 221.

The writer presents a summary of 106 abdominal Cesarean sections performed in the University Hospital of Lund. In the overwhelming majority of cases (74) the operation was necessitated by a disproportion between pelvis and head. In this group only one mother, already infected, died. Of the 10 eclampsia patients 3 died after abdominal section. This forces him to the conclusion that in this class of cases the vaginal Cesarean section is preferable, if not contraindicated by anticipated difficulties. Abdominal Cesarean was performed for placenta previa on 7 patients. The operation, in the writer's belief, should be limited to not infected patients with severe hemorrhage if the cervix is not sufficiently dilated for a version. Of the total series in 8 cases a radical operation of the Porro type was made for existing or only suspected infection. These 8 patients recovered.

**Loenne: Indication and Prognosis of Cesarean Section.** Zentralblatt für Gynäkologie, 1919, xliii, 501.

Loenne analyzes in this paper a continuous series of 100 Cesarean sections. The indication for this operation was narrow pelvis in 93 cases; eclampsia in 1; rectal carcinoma in 1; abnormal head presentations in 3 cases. Many of the patients had been frequently examined, also by midwives, before admission to the hospital, and 13 of them showed an elevation of temperature before operation. The classical operation (with transverse fundus incision) was performed 48 times, the extraperitoneal section 27 times, the cervical transperitoneal modification 25 times. Only one patient died after operation, however, as the result of a cardiac insufficiency and nephritis. The patient was afebrile, and a classical section had been done. For the infected cases the transperitoneal method proves the most advantageous. The writer emphasizes the relative frequency of wound infection after the extraperitoneal operation.

**Weymeersch: Conservative Cesarean Section after the Rupture of the Membranes.** Revue française de gynécologie et d'obstétrique, 1920, xv, 97.

The idea, first promulgated by Schauta and now rather generally accepted, that the classic operation must be limited to the surely aseptic cases with an intact ovum, in the author's opinion, does not need

be rigidly enforced. Zarate attempted to protect the peritoneal cavity and the external surface of the uterus from contamination, by surrounding carefully the uterus with sterile gauze compresses and making the incision through this covering. He also placed a Mickulicz drain into the lower wound angle for protection. Weymeersch applied this technic in five cases, omitting the drain. All patients recovered. In his opinion the rupture of the membranes in itself should not be considered a contraindication against the conservative classical method to which he gives preference over the extraperitoneal and transperitoneal modifications.

**Lecocq: Abdominal Hysterectomy of the Unopened Full Term Uterus.**

*Annales de gynécologie et d'obstétrique*, 1919, lxxii, 541.

This entirely original method of removing the uterus still containing the live fetus was first suggested and executed by Reymond. A detailed record is given of five operations performed in this manner. All five children were saved. One mother died of general peritonitis. In this case the already present severe infection formed the indication for this particular operation. In general this operation should be performed whenever a hysterectomy or a Porro operation seems indicated. A contamination of the abdominal cavity with the escaping amniotic fluid thus is excluded. The uterus, quickly removed, is taken to another room, opened by an assistant and the child extracted. The essential point in the successful performance of this operation lies in the limitation of the time between the last ligation and the opening of the uterus. It varied in these five cases between 27 and 30 seconds. The placenta apparently contains enough oxygen to prevent asphyxiation.

**Bar: The High Cesarean Section.** *Archives mensuelles d'obstétrique et de gynécologie*, 1919, viii, 49.

In this group of 275 operations performed by him, only 12 times he operated after labor was well under way. The ideal conditions for abdominal Cesarean are represented in the woman just starting in labor with membranes intact. It has become his routine to make the incision high on the anterior uterine wall, running it up to the fundus. He tries to delay the rupture of the membranes as long as possible by cutting first a small button hole, through which he pushes a finger, loosening widely the membranes. Then the incision is extended. Of the last 97 sections in every instance the well mother left the hospital nursing her child. But figures taken from various sources still reveal a maternal mortality of from 2 to 12 per cent.

**DeLee: Newer Methods of Cesarean Section.** *Journal of American Medical Association*, 1919, lxxiii, 91.

The choice between extraperitoneal and transperitoneal methods is still undecided, but the majority of operators seem to prefer the latter. In the presence of insuperable mechanical disproportion, that is, of the absolute indication for Cesarean section, therapeutic abortion today is absolutely contraindicated. At full term four courses are available to select from: the classic Cesarean, the Porro modification, the transperitoneal cervical section, and the extraperitoneal operation. In clean and suspected cases DeLee recommends the transperitoneal cervical



section, and in frankly infected cases either the extraperitoneal section or Porro. Only if Cesarean section is done for placenta previa he prefers the old classical operation. In abruptio placentaë the transperitoneal is the method of choice, unless great speed is required to save the child.

**Beck: Observations on a Series of Cesarean Sections.** American Journal of Obstetrics, 1919, lxxix, 197.

The writer presents a detailed report of 37 personal cases and a statistical study of morbidity of 107 consecutive sections performed within the last six years in the Long Island College Hospital. He concludes the paper with the description of a new method which represents a modification of the Kroenig procedure. In this latter operation better peritoneal protection is obtained by utilizing the bladder reflection to cover the incision in the lower uterine segment. He was induced to develop this modification by the observation of a slough of the apex of the bladder flap which led to the partial uncovering of the uterine wound, and finally to the death of the patient. The new modification attempts to relieve the tension on this upper end of the bladder flap. After the bladder and its peritoneum have been stripped off from the anterior uterine surface, as in an abdominal hysterectomy, also the peritoneum on the upper side of the transverse incision is carefully freed from its attachment to the uterus, the two denuded peritoneal flaps are retracted, up and down, exposing enough of the uterine wall to permit an ample incision. After removal of fetus and placenta, and closure of the uterine incision in two layers, the upper peritoneal flap is brought down over the superior portion of the closed incision, and anchored with a few interrupted catgut sutures, avoiding the uterine suture line in the middle. The bladder reflection now is carried about 1 cm. above the site of the original transverse incision, thus lapping the peritoneal flaps and thoroughly sealing the uterine wound.

There was a gross mortality of 3.8 per cent in the entire series of 105 consecutive cases. The mortality in 19 cases previously handled on the outside was 16 per cent. The mortality of 86 cases handled entirely within the hospital was slightly over 1 per cent. The morbidity varied between from 13 to 70 per cent according to the absence or presence of the conditions which govern morbidity.

**Scheyer: Extraperitoneal Cesarean Section in the Breslau Gynecologic Clinic.** Zentralblatt für Gynäkologie, 1920, xlv, 1032.

The old classical operation is only performed if complicating conditions demand this type of hysterotomy. The extraperitoneal modification was the operation of choice in 49 of the 57 cases considered in this inaugural dissertation. The routine adoption of this operation seems desirable because the possibility of existing infection in the individual case can hardly be excluded. The operation is safe. In the 3 patients, who died, the operation itself was not responsible for the unfortunate outcome. The fetal mortality was 7.5 per cent. Interesting in the casuistic of morbidity are 6 cases (2.2 per cent) of bladder injuries, and one case of ureterovaginal fistula. Out of 8 cases, in which the Cesarean was performed for the second time, 7 showed the old scar unimpaired by the new pregnancy.

**Gall: Pubiotomy or Transperitoneal Cesarean Section.** *Monatsschrift für Geburtshilfe und Gynaekologie*, 1919, xlix, 438.

From his personal experience and a careful study of the literature the writer concludes that the transperitoneal Cesarean section as a whole offers so many advantages over pubiotomy and symphysiotomy that it must be given preference.

**Rivière et Lacouture: A Primary Abdominal Pregnancy after Cesarean Section.** *Revue française de gynécologie et d'obstétrique*, 1920, xv, 43.

About one year after an abdominal Cesarean section a peritoneal crisis manifested itself after a period of amenorrhea lasting a little more than five months. On opening the abdomen a macerated five months fetus was found, lying in the peritoneal cavity, the placenta being attached in right iliac fossa. The placenta could be ablated without difficulty and without causing a severe hemorrhage. The uterus then was removed. The right tube was found closed, the left greatly altered. The writers express it as their belief that this is an instance of primary abdominal pregnancy.

It seems noteworthy that in the scar of the old Cesarean incision the muscular edges were seen widely separated, the mucosa alone apparently having united.

**Markoe: Cesarean Section Following a Previous Extraperitoneal Cesarean Section.** *New York Medical Journal*, 1919, cix, 1022.

Markoe during an abdominal Cesarean section had an opportunity to inspect the effects of an extraperitoneal Cesarean made 15 months ago. At that time the patient was suffering from a mixed infection of colon bacilli and nonhemolytic streptococci. Carrel treatment instituted immediately after the operation sterilized the infected tissues around the bladder and lower uterine segment so effectively that no more bacteria were to be found on the twelfth day, allowing the wound to close rapidly. At the time of the subsequent Cesarean operation no adhesions could be discovered in the bladder region or in the broad ligaments.

**Williams: Delivery by the Natural Passages Following Cesarean Section.** *American Journal of Obstetrics*, 1919, lxxx, 435.

Since 1916 much information of the healing of Cesarean scars has been obtained. J. Whitridge Williams studied 10 uteri containing scars from previous Cesarean operations. In 8 of these it was difficult to distinguish the scar by the naked eye, and histologic examination showed complete regeneration of the muscle fibers with no fibrous tissue scar. In another specimen there was marked thinness of the scar, but it consisted only of regenerated muscle fibers. In the tenth case the scar was imperfect and rupture had occurred. Spalding studied histologically 4 Cesarean scars and found all thinned, and more or less defective. He believes that a sac of the membranes enters the depression in a thinned scar, and then acts very much like the bag of waters in dilating the cervix. Eventually a uterine rupture is caused. Losee examined 20 Cesarean scars. He also observed that in a perfectly healed scar the muscle is perfectly regenerated and no fibrous tissue is found. When infection occurs, however, union takes place by the formation of fibrous tissue and without regeneration of the muscle.

Mason reported 19 previously unrecorded cases of vaginal delivery following abdominal sections. None of these scars ruptured. On the other hand it must be admitted that many reports of ruptured Cesarean scars have appeared in literature. Findley collected and tabulated 63 such cases up to 1916, and since that time many additional observations have been recorded.

Adding a few more cases of normal vaginal delivery subsequent to a Cesarean to two cases described in detail in a previous paper, Williams reiterates his opinion that the mere presence of a scar in the uterus is not sufficient reason for a repeated Cesarean. If the scar has healed without sepsis, the patient may be delivered later by normal labor in safety. Such patients should, however, be managed in a well equipped hospital where in case of necessity an abdominal section can be performed without delay. Great care must be taken in proper approximation during the closure of the uterine wound to obtain a scar equal in strength to any part of the uterine wall.

**Nacke: Spontaneous Rupture of Uterus at the Moment of Opening the Abdomen for Cesarean Section.** *Zentralblatt für Gynäkologie*, 1919, xliii, 334.

The title states the author's unusual experience. Remarkable is the fact that Nacke had the rare opportunity of observing this same phenomenon in two patients. In both instances the laparotomy was performed for a second Cesarean. In both the rupture occurred in the old scar at the moment when the uterus was delivered through the abdominal incision. In his belief, the attachment of the placenta at the site of the scar caused its weakening. The rupture occurred when the protecting counterpressure of the abdominal wall against the weakened area was removed by lifting the uterus through the abdominal opening.

**Seitz: Removal of Exostosis of Symphysis during Cesarean Section.** *Monatsschrift für Geburtshilfe und Gynaekologie*, 1919, 1, 15.

Seitz performed this operation in two patients. In the first case two Cesareans had been made previously. During the third section he removed a high spur from the posterior surface of the symphysis and succeeded, as ascertained by direct measuring, in lengthening the true conjugate from 8 to 9½ cm. An examination made 3 months later proved that the obtained increase of 1½ cm. had remained unchanged.

In the second case he found and chiseled away a broad ridge, thus enlarging the true conjugate by 1 cm. Exostoses of this sort can often be palpated, especially in rachitic patients. Their removal during a Cesarean section is easily accomplished and apparently results in a permanent enlargement of the true conjugate. There are as yet no records available of labors subsequent to this operation.

**Linzenmeier: Cesarean Section on the Dying or Dead Patient.** *Medizinische Klinik*, 1920, xvi, 439.

The writer pleads in favor of the Cesarean attempt on the dying patient. In his personal experience with 4 sections after death he obtained 3 living children. The difficulties in the private house are undoubtedly considerably greater than in hospital practice to obtain permission of the family for the performance of this operation, however,



it seems inexcusable to wait for sentimental reasons until the patient is dead, if an operation performed a little earlier actually affords a chance to save the life of the fetus.

**Slemons and Johnson: Cesarean Section under Procain Anesthesia.**  
Journal of American Medical Association, 1920, lxxiv, 882.

Toward the successful treatment of pregnant women suffering from decompensated cardiac lesion, especially with renal complications, nothing proves more helpful than a satisfactory local anesthesia, permitting a safe and speedy evacuation of the uterus. Procain meets this requirement. In general the writers agree with Webster's great satisfaction with procain. However, they find that a weaker solution (1:400) with the addition of three drops of epinephrin to each ounce of the solution, proves equally as effective. The delivery of the uterus through the abdominal incision, which Trout (*Surgery, Gynecology and Obstetrics*, 1918, xxvii, 95) describes as the crucial step in a Cesarean under local anesthesia, is rarely advisable even under general anesthesia. If this procedure is omitted under local anesthesia, the incision can be made shorter, and the patient is spared at two points: when the uterus is delivered, and when the fetus is extracted. Thus extraction and all manipulation on the lower uterine segment is avoided, which also Webster found to be a painful maneuver. Essential for the successful performance of a Cesarean under local anesthesia are two facts, namely, preliminary administration of morphine and a cooperative attitude on the part of the patient.

**Irving: Cesarean Section under Local Anesthesia Combined with Morphine-Scopolamine Narcosis.** Boston Medical and Surgical Journal, 1920, clxxxii, 578.

The special indications for this anesthesia in cases of abdominal Cesarean section are such grave complications of labor as cardiac disease, diabetes, nephritis, cardiorenal disease, pulmonary tuberculosis, and bronchial asthma. The essential features for success are: sufficient time both for general medication and local anesthetic to take effect, and the studious avoidance of all rough manipulation. The author gives no preliminary cathartic, only a low enema the morning of the operation. The ears of the patient are plugged with cotton. While still in bed she is given  $1/6$  gr. of morphine with  $1/200$  of scopolamine subcutaneously. The morphine is not repeated. The same dose of scopolamine is repeated every 40 minutes until the patient is quiet and dozing. This result, as a rule, is obtained with three doses. Then her eyes are covered and she is quietly transferred to the operating room. The operation is not begun before she is asleep. Just before the operation is started another  $1/200$  of scopolamine is injected. Infiltration in usual manner is made with a one per cent solution of novocaine or procaine.

The writer considers in detail the special indications for dealing with cardiac cases.

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## Original Communications

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### A NEW METHOD OF SUBPERITONEAL SHORTENING OF THE ROUND LIGAMENTS OF THE UTERUS\*

A REPORT OF 100 CASES WITH ANALYSIS OF END RESULTS

BY HERMANN GRAD, M.D., F.A.C.S., NEW YORK, N. Y.

THE claim has been made that retrodisplacement of the uterus *per se* requires no treatment, as it gives rise to no symptoms. Many statistics were brought forward to prove this contention.

Winternitz says that retrodeviations of the uterus are not the cause of symptoms and we have therefore only to consider the complications. He supports his statements with the following statistics; in 710 apparently healthy women, 154 had retroflexed uteri, of these 90 (60 per cent) complained absolutely of no gynecologic symptoms. A closer examination of symptoms in the remaining 40 per cent revealed the fact that in nearly all cases the symptoms were due to coexisting complications. He says that retrodeviation does not create congestion and concludes "to operate on a healthy woman because she has retroflexion is absolutely uncalled for."

Lucy Wait<sup>1</sup> says "in 396 cases, 39 per cent of a thousand cases taken from the records of my clinic at the Mary Thompson Hospital, 62 (15 per cent) presented no gynecologic symptoms and were referred to the Medical Clinic without exception, the remaining 338 cases presenting symptoms were recorded as complicated with definite pelvic or abdominal pathologic conditions." These were classified as follows:

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\*Read at the meeting of the New York Obstetrical Society, November 9, 1920.

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

Myomata .. .. .	24	8 per cent
Ovarian tumor .. .. .	17	6 per cent
Acute pyosalpinx .. .. .	8	3 per cent
Chronic disease of ovary or oviducts. .	116	35 per cent
Myometritis .. .. .	104	30 per cent
Pregnancy .. .. .	8	3 per cent
Remaining .. .. .	55	17 per cent
Carcinoma uteri .. .. .	6	2 per cent

In a large percentage of these cases pelvic exudates and extensive adhesions were found. There were other complications including appendicitis, hernia, nephroptosis, hemorrhoids and recent puerperal cases.

These statistics are highly interesting, nevertheless exception must be taken to the above dictum that "retrodisplacement of the uterus *per se* causes no symptoms and requires no treatment." It is the experience of every gynecologist that there are cases where retrodisplacement *per se* does cause subjective symptoms and no palliative measures will give relief. On the other hand, surgical replacement of their retrodisplaced uteri will give these sufferers positive and lasting relief. It is also the experience of every gynecologist that an uncomplicated retrodisplacement of the uterus predisposes the patient to morbidity of the uterus and appendages. If this observation is correct why deny these cases palliative measures or even operation as a prophylactic measure?

Surgical experience has shown it to be a fact that a large number of young women, with retroversion of the uterus, have been lifted out of the bondage of hopeless invalidism and returned to active womanhood by operation.

Granted then that an operation for displacement of the uterus is a legitimate one and fulfils a useful and needed purpose, is it surprising that we have so large a number of operations for the correction of displacements of the uterus? Bovee<sup>2</sup> says that sixty different operations have been devised for the correction of uterine displacements. It is therefore with considerable hesitation that I shall add another one to this long list by bringing this new operation before the profession.

All operations devised for the correction of uterine displacements can be divided into four types and all of them utilize the round ligaments, the broad ligaments, the uterosacral ligaments for plication or making them shorter, or else the fundus of the uterus is sutured to some part of the abdominal wall.

The Alexander operation is the first type and was the first one devised for shortening the round ligaments of the uterus. Most excellent results are obtained by the operation. It requires considerable amount of skill and failures in finding the ligaments are frequent. Experience also shows that many Alexander operations fail to give relief to the patients, because as the abdomen is not opened, intraperitoneal lesions



are often overlooked. The Alexander operation or any modification of the same, does not provide for the surgical relief of intrapelvic lesions which are so frequently encountered with retroversion of the uterus. It is an operation that in selected cases gives very excellent results. The operation utilizes the strongest portion of the round ligament, namely, that portion nearest to the uterus, which is a strong point in its favor. The objections to the operation are four: (a) It is difficult of execution; (b) frequent failures to find the ligaments; (c) the ligaments tear during manipulation; (d) it does not provide for intrapelvic work, and does not allow one to fortify the shortening of the round ligaments by shortening of the uterosacral ligaments, or plication of the broad ligaments.

The Gilliam operation, the second type, for shortening of the round ligaments and the Simpson modification, are extensively used. The operation gives excellent results. The objections to the operation are, that it creates unnatural conditions in the abdominal wall by uniting structures contrary to nature and by inviting serious intraabdominal complications.

The Wylie, Mann, Baldy-Webster are included in the third type of operation. They have the objection of utilizing the weakest portion of the ligaments. Statistics have shown that relapses are frequent after this type of operation. The same is true of the fourth type of operation, of ventrosuspension.

A very excellent and ingenious operation for shortening of the round ligaments is the Bissell operation. This operation was devised by Dr. Dougal Bissell in 1908. It is an operation that meets all requirements and is free from objections of other methods of shortening the ligaments. It calls for the hands of a skillful surgeon, for hands accustomed to plastic work, and for careful coaptation of delicate tissue structures. The operation gives permanent results and recommends itself very highly.

All operations of plication of the broad ligaments have the objection of being complicated and give by no means uniform results, in curing retroversions. The operations that simply plicate the ligaments on themselves have very little to recommend them as they rarely succeed. Recurrence after this type of operation is the rule rather than the exception.

The study of the subperitoneal shortening of the round ligaments of the uterus, reported in this paper, was begun over eight years ago. The object in view then was to develop a method of shortening of the round ligaments which would be simple of execution, free from objections of other methods in use, and permit of other intraperitoneal work. In all modesty I believe that the object sought has been attained, and that this new method of shortening the round ligaments, to be described

in this paper, is a very simple one to execute, the operation gives excellent results, and is free from objections of other methods.

Eight years have now elapsed since the inception of the new method of shortening of the round ligaments, which I believe is sufficient time to judge of the remote results of the operation. The description of the operation was purposely withheld from publication up to this time, because I desired to convince myself of this remote result. In an operation of this type, time must elapse in order to study late results. Several hundred of these operations have now been done and the first 100 cases were taken as a basis of study. It was impossible to keep under observation all of the 100 consecutive cases of retroversion on whom this method of round ligament shortening was practiced. As is well known, patients constantly shift their abode. However a sufficient number of cases lent themselves to the study of this problem, and the statistics plainly show that the operation gives most excellent results.

The operation here devised aims to fasten the strongest portion of the round ligaments to the fibers of the internal ring of the inguinal canal, where the round ligaments emerge from the abdominal cavity. The ligaments are bared of their peritoneal investments and therefore cannot fail to unite along the suture line. The proper amount of shortening of the round ligaments in each case can be measured to a nicety. By this method of operation no abnormal conditions are created in the pelvic cavity or abdominal wall. No holes are tunneled through the abdominal parieties. The ligaments cannot be overstretched and their vitality endangered by interference with their circulation. It is a definite surgical procedure with no drawbacks. Every step of the operation is under perfect mechanical control. The Fallopian tubes are not liable to become traumatized or kinked. The mesosalpinx is not encroached upon. With the operation completed, the pelvic organs are left in a normal condition.

The operation of shortening the round ligaments is as a rule supplemented by shortening of the uterosacral ligaments and in a certain number of cases, the fundus of the uterus is held forward by a temporary catgut suture, which is placed in a special way, to be described in the technic of the operation.

#### TECHNIC OF THE OPERATION

(a) *Shortening the Round Ligaments.*—The operation here devised is a very simple one. It is a surprise that it has not been described before. The abdomen is opened by an incision in the midline below the umbilicus, or transverse. The transverse incision is preferable in thin women. After the peritoneum is opened, the pelvis is cleared of intestines, cecum and sigmoid. Whatever intrapelvic work is necessary is first completed. Adhesions are broken up, ovaries and tubes

inspected and the fundus of the uterus brought forward. A good exposure is essential and expedites the operation.

The round ligament on the right side at its mid-point is grasped with an Ellis clamp, sponge holder or any suitable instrument that will not unduly traumatize the ligament. Traction on the clamp puts the ligament on the stretch, and by doing this two sides of a triangle are formed. One side of the triangle is the round ligament from the grasp of the forceps to the internal ring of the inguinal canal where the ligament emerges, while the other side of the triangle is the ligament from the grasp of the forceps to its uterine end.

At this step of the operation it is very essential to expose the under

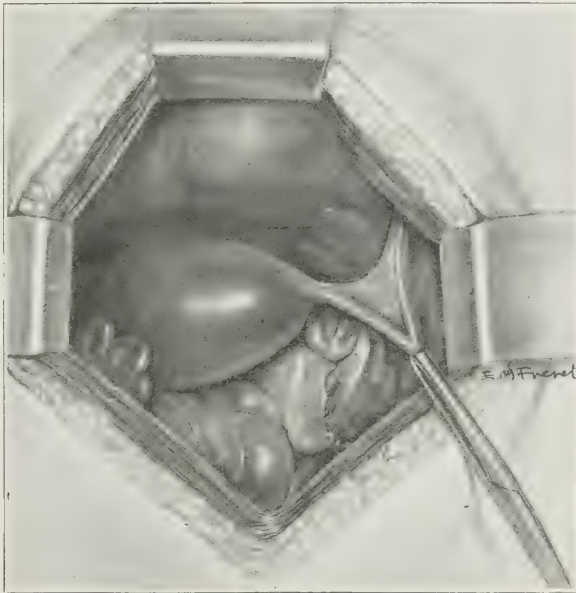


Fig. 1.—Shows uterus exposed, round ligament seized with forceps and made tense.

surface of the abdominal wall where the round ligament emerges, which is readily accomplished by proper retraction. By stretching the round ligament in the manner described, the two leaves of the broad ligament are also made taut. This is the first step in the operation as shown in Fig. 1.

Opposite the grasp of the forceps on the round ligament, and immediately below the edge of the ligament, the operator picks up the anterior layer of the broad ligament with a thumb forceps and nips it with scissors. Beginning at this point, with the scissors, the incision in the anterior layer of the broad ligament is extended, along the edge of the round ligament, until the internal ring of the inguinal canal is reached where the ligament emerges from the abdominal cavity. In this manner the entire round ligament is laid bare, divested of its peritoneum,



and the two layers of the broad ligaments are separated, as shown in Fig. 2.

If the incision in the anterior leaf of the broad ligament is properly planned, the operation will be entirely bloodless. The two leaves of the broad ligament can now be further separated with the finger.

With the two leaves of the broad ligament opened up, the external iliac vessels are plainly visible a little below where the round ligament enters the ring on its way to the inguinal canal. These vessels are the only structures the operator must bear in mind in this operation. There

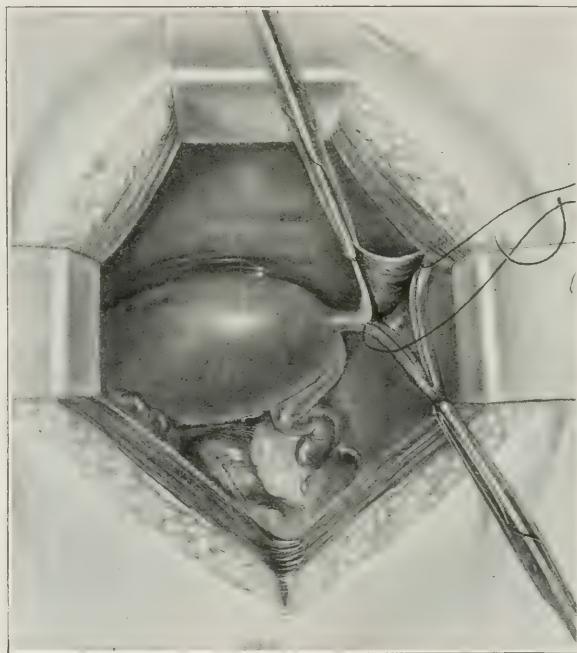


Fig. 2.—Showing anterior layer of broad ligament separated from posterior, with round ligament bared but remaining attached to posterior layer of broad ligament. First linen stitch shown in place.

is no danger of wounding these vessels. Only gross negligence could possibly injure them.

Having divested the round ligament of its peritoneum and having exposed the internal ring and with the round ligament plainly in view as it leaves the abdomen, the operator takes a stitch of linen in the pillars of the ring and also picks up in the stitch, half of the round ligament as it enters the ring. A half tie is now made in the suture, so as to anchor the ligament to the fibers of the ring at this point. With the same suture the round ligament is picked up, inside of its denuded area, about three-fourths of an inch to one inch from its uterine end, shown in Fig. 2, depending upon the laxity of the ligament, and the two points of the ligament brought together by tying the linen

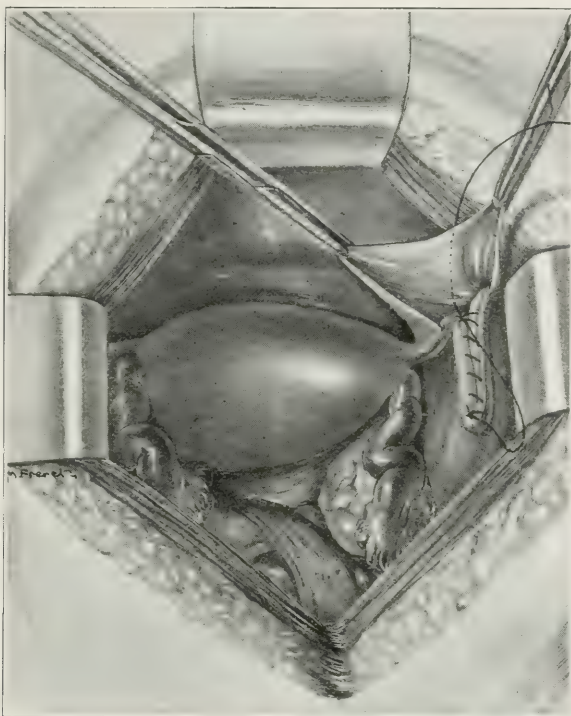


Fig. 3.—Showing redundant portion of bared round ligament sutured with linen, the end of the latter pulled through anterior layer of broad ligament.

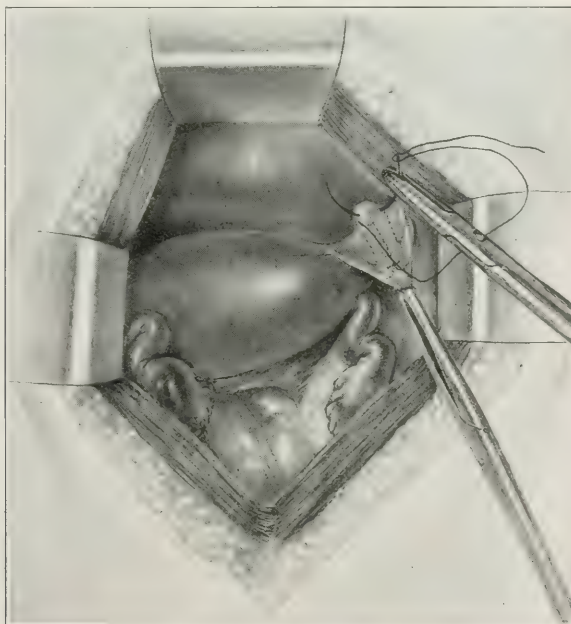


Fig. 4.—Showing sutured portion of round ligament buried between the two layers of the broad ligament and anchored in place with the linen stitch which was drawn through the anterior layer.

suture. The uterine end of the ligament may now be sutured to the pillars of the ring securely with two, or even three linen sutures, so as to shorten up the ligament to a desired measure. The redundant portion of the round ligament, which is also denuded is now sutured together as is shown in Fig. 3.

The superfluous portion of the round ligament, which has been sutured together, is now buried between the layers of the broad ligament and the suture tied in the manner shown in Fig. 4.

The anchoring of the round ligament to the fibers of the internal ring of the inguinal canal, the coaptation of the denuded portion of the

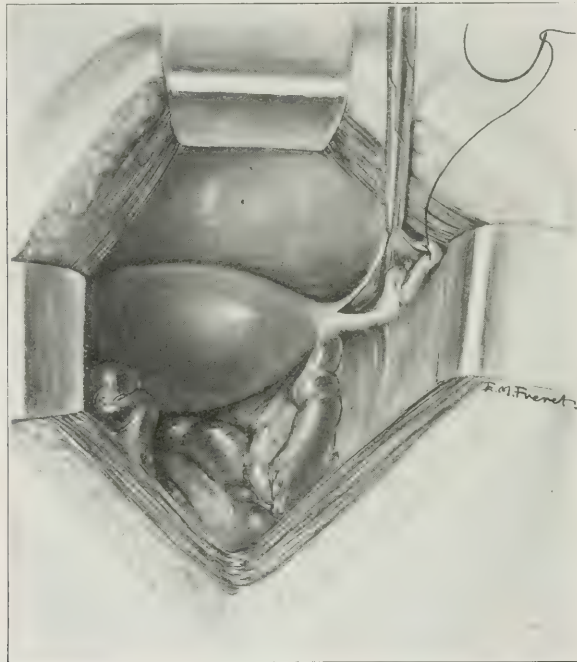


Fig. 5.—Showing anterior layer of broad ligament sutured with plain catgut to posterior layer of round ligament.

ligament, and burying of the superfluous portion, is all accomplished with one linen suture in a very expeditious manner.

The anterior leaf of the broad ligament, which has been cut away from the anterior surface of the round ligament is now sutured, with catgut, to the posterior surface of the round ligament, in such a manner as to cover all raw surfaces, as is shown in Fig. 5.

The round ligament on the opposite side is shortened up in exactly the same manner as described above.

When the operation is finished, it will be found that no unnatural conditions have been created by the operation. There has been no encroachment on the mesosalpinx and there has been no kinking of



the Fallopian tubes, in any manner, shape or form. The abdominal wall has not suffered any injury, the round ligament is not subjected to any devitalizing influence of pressure and no nerve filaments have been traumatized. The round ligaments have been shortened up in a very simple manner, and as the work has been done on denuded surfaces, union of surfaces will surely occur and the ligaments will be permanently shortened.

Under certain conditions the subperitoneal shortening of the round ligaments is supplemented by two other operations, namely, an intraperitoneal ventrosuspension and a shortening of the uterosacral liga-

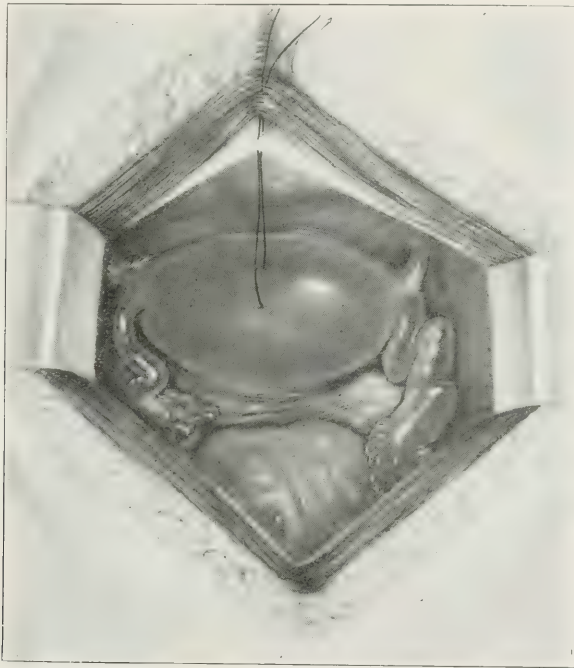


Fig. 6.—Showing intraperitoneal ventrosuspension stitch of chromic gut.

ments. These two additional procedures are of vital importance in many cases in effecting a cure of the retroversion. In all cases where there has been an undue laxity of the round ligaments and where there has been a tendency to decensus of the cervix, the round ligament operation should be supplemented by shortening of the uterosacral ligaments.

(b) *Intraperitoneal Ventrosuspension*.—This differs from an ordinary ventrosuspension by the fact that the two peritoneal surfaces to be brought into apposition are not traumatized. It is not intended that union should occur between these two peritoneal surfaces. The surface epithelium of the peritoneum is not disturbed by scarification or sponging. The object of the suture is to hold the fundus of the uterus

forward temporarily. The suture is to prevent an overdistended bladder forcing the fundus of the uterus backward towards the sacrum, and thereby exerting tension on the new suture line in the round ligaments. The suspension suture is to hold the fundus forward until firm union occurs in the suture line of the round ligaments. When the catgut suture is absorbed the fundus is freed from its grasp. The intraperitoneal suspension stitch is placed as is shown in Fig. 6.

The suture consists of 20-day chromic catgut. It enters the fascia in the midline, penetrates it and the peritoneum, from without, about an inch from the incised edges of the fascia and peritoneum. The

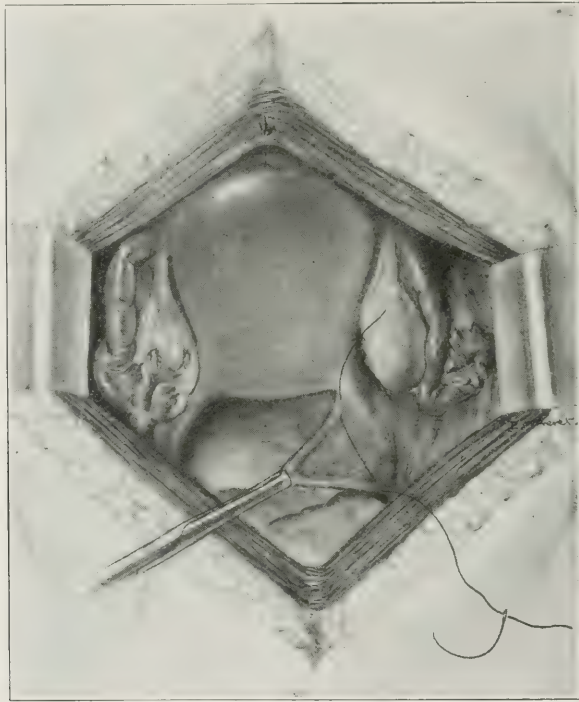


Fig. 7.—Showing uterosacral ligament put on stretch and sutured with linen thread.

suture now picks up the musculature of the fundus of the uterus in the midline, as shown, penetrates the peritoneum from within out and emerges through the fascia about a quarter of an inch distant from where it entered. The suture is now tied, bringing the fundus of the uterus well under the peritoneum, away from its cut edge, as shown in Fig. 7.

The suspension suture in a mechanical way protects the suture line in the round ligament until a firm union occurs. When the suture in the fundus becomes absorbed, the fundus drops away from the abdominal wall.

In three cases an opportunity was offered to inspect the site of the

previous operation and it was found that no suspensory band was formed, the fundus of the uterus was free, and not the slightest indication was found that the peritoneum was in any way disturbed. This is precisely what one would expect from a suspension stitch planned as is the intraperitoneal suture. No possible union can occur between the two peritoneal surfaces if care is taken not to traumatize them. The suture serves a very useful purpose, because it prevents the fundus from turning during the time of the healing of the round ligaments. The stitch is recommended in every case of shortening of the round ligament where the fundus of the uterus can be brought in contact with the abdominal wall without tension. If the anatomic conditions are such as not to allow the fundus and abdominal wall to come

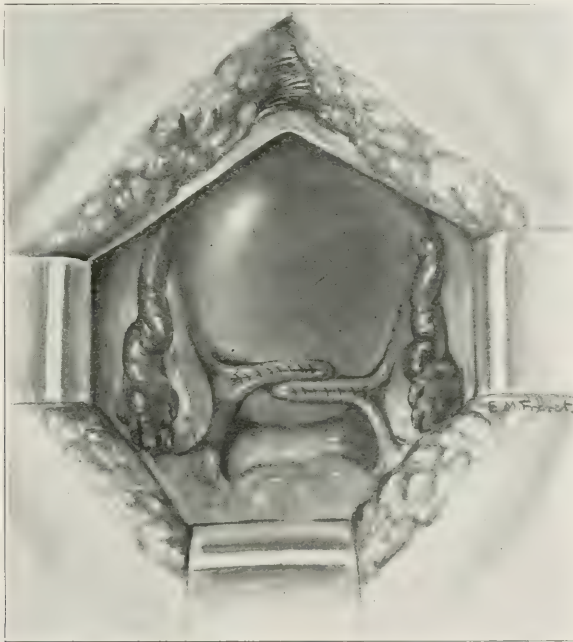


Fig. 8.—Showing suture of uterosacral ligaments to posterior surface of uterus.

in contact with ease, the suspension suture should not be used. In those cases extra precaution is to be exercised in not allowing the bladder to distend and force the fundus of the uterus backwards. The patients should be catheterized every six hours systematically to avoid over-distention of the urinary bladder.

(c) *Shortening of the Uterosacral Ligaments.*—The uterosacral ligaments should be shortened in all cases where they are unduly relaxed, and also in all cases where there is the slightest degree of descensus of the cervix uteri. Under certain conditions difficulty will be encountered in shortening up the ligaments. Proper orientation of the work will overcome many of these.



By orientation is meant placing the patient in proper Trendelenburg position, freeing the pelvis of adhesions, packing away intestines, cecum, and sigmoid, and keeping the ovaries out of the field of operation if necessary with a stitch.

There are several procedures for shortening up the uterosacral ligaments. A very simple one is to grasp the ligament midway between uterus and sacrum putting the ligament on the stretch, as shown in Fig. 8.

The ligament is now sutured together with a linen suture, the first stitch is shown in Fig. 7. The free edge of the uterosacral ligament is now sutured together, and sewed to the posterior surface of the uterus, as shown in Fig. 8.

#### SUMMARY OF OPERATIVE RESULTS IN A SERIES OF 100 CASES

Social Condition				Bore Children		Miscarried		
Married	Single							
71	29			43			5	
Symptoms								
Backache							42	
Pelvic or Abdominal Pain							39	
Dysmenorrhea							10	
Metrorrhagia							8	
Leucorrhœa							7	
Headache							5	
Bearing Down							5	
Sterility							4	
Weakness, Tired Feeling							3	
Frequent Urination							2	
Ages								
16-20 Years	20-30	30-40		40-50		Total		
9	51	33		7		100		
Duration of Symptoms								
1 Yr. or Less	2 Yr.	3 Yr.	4 Yr.	5 Yr.	6 Yr.	7 Yr.	Indefinite	Total
29	17	6	4	2	2	2	38	100

This summary shows that out of 71 married women, 43 bore children, 5 had miscarriages. Only those symptoms were recorded which appeared most prominent to the patient at the time of the examination. Several symptoms may be present in the same case, but only the most prominent ones were recorded.

The chart shows that 42 patients complained of backache and 39 patients had pelvic or abdominal pains. In all these cases more than one symptom was complained of by the patient.

In making up statistics of symptoms one is confronted by many difficulties, because one is dealing with a very variable condition. Not much reliability can be placed on statistics obtained from so variable a condition as symptoms. All that one can say in studying the symptomatology of retroversion of the uterus is, that there is a neurotic condition encountered in these patients and no reliability can be placed on their statements, which are often at great variance with each other. A statement made one day will be refuted at the next examination, say

a week later. The symptoms are fleeting and change from time to time. This much, however, can be stated with a good deal of positiveness, namely, that a certain number of patients with retroversion of the uterus are neurotic and a certain number of them suffer with gastrointestinal symptoms, anorexia, belching, indigestion, constipation.

*Neuroses.*—The neurotic symptoms are very variable and fleeting. It is one thing one day and the next day something else. Pains and aches are noted in various parts of the body. Insomnia, weakness, loss of ambition, indifference. Cases of this type should be sent to the neurologist for investigation before operation. The study of this class has convinced me that if no definite neurotic taint exists to fully account for the symptom-complex presented by the patient, operative procedure will give the patient relief of many of her symptoms and many of these cases can be restored to active womanhood by operation.

*Backache.*—The caution necessary to exercise in the handling of these neurotic cases applies equally to the cases with "backache." Nothing short of a painstaking examination will suffice in properly diagnosing these "backaches." In some cases even the aid of the orthopedist is necessary to establish a proper diagnosis of the cause of the "backache."

The study of the cases here reported shows that a positive relief of "backache" can be expected if the operation succeeds in holding the uterus in normal position, provided the backache depended on the displacement of the uterus or some associated pelvic pathology which can be dealt with during the operation.

Another fact must be borne in mind in connection with this subject, namely, that in the same patient two or even more causative factors may be present, and the "backache" will not be relieved unless all causes are removed. In a small number of cases, the "backache" will persist after all effort and the application of every known curative measure, operative, orthopedic or otherwise. These rebellious cases of "backache" foil every effort and all measures of relief.

In some of my rebellious cases of "backache" cures were effected in an interesting manner. In some cases, the backache persisted after operation, and after orthopedic as well as electrotherapeutic measures, including massage. It will be noticed that the "backache" in these cases is severest during the morning hours. During the afternoon the "backache" is much better. These cases as a rule obtain much relief from the operation, they are much better in every way, except for the backache in the morning. As an experiment in these cases it is advised that they change their mattress on the bed, substitute one that is less soft, believing that the backache may be due to some postural muscle strain during sleep. This idea is not new with me, as I read about it some years ago. The experiment in a few cases proved very successful. After the lapse of ten days or so, the morning backache fails to

appear. They must persist in sleeping on a hard mattress to avoid muscle strain produced by the posture they assume on a soft mattress during sleep.

*Dysmenorrhea.*—In the cases with dysmenorrhea, four obtained relief of the symptoms. One was only partially relieved, and five cases were not reexamined, passing from observation. In one case the patient felt very grateful for the great relief obtained, but in this case a stem pessary was also used. All these cases with dysmenorrhea had also a divulsion and a curettage. While no definite conclusions can be drawn, it is safe to say that dysmenorrhea will be relieved by the operation in a considerable number of cases.

*Metrorrhagia.*—Six cases of metrorrhagia were reexamined and all were found to have obtained relief of symptoms. In one case, (No. 12088), a reexamination five years after the operation disclosed the uterus in good position and no metrorrhagia since the operation. Two cases with metrorrhagia as a symptom, passed from observation.

*Leucorrhea.*—Nothing definite can be said about the cases with leucorrhea, headache and bearing down pains, as the information obtained from these cases is incomplete and unreliable.

*Sterility.*—In the four cases with sterility, two disappeared from observation, one case was not heard from since 1916, at that time she was in good condition, but had not conceived. One case conceived eight months after operation and was confined with a normal labor. Nine months after delivery her uterus was found in good position.

Both cases were relieved of frequency of urination, no bladder disturbance was complained of after operation.

*Ages.*—Regarding the ages, the largest number, 51, occurred between twenty and thirty. Nine cases were under twenty years of age, 33 between thirty and forty, and 7 over forty years of age.

*Duration.*—It was difficult to obtain reliable information regarding the duration of the symptoms. In 38 cases the patients could not tell definitely how long the symptoms lasted. In 29 cases it was less than a year and in 17 cases the duration was two years before surgical relief was sought. In two cases the duration of symptoms was over seven years.

#### STUDY OF END RESULTS

For the study of the end results of the operation described in this paper, 100 consecutive cases were taken from the records of the Woman's Hospital. These operations were performed during the fiscal years from 1913 to 1918 inclusive.

During the summer and fall of 1919 the records of the 100 cases were compiled and every effort made to reexamine the cases. Thirty-seven could not be traced. This is unfortunate as valuable data are thus missing. However, a sufficient number of cases have been studied to show that the operation is an efficient one, it will hold the uterus in normal



position and give relief from symptoms. Sixty-three cases were reexamined at various periods after operation. In all except three, the uterus was found in good anatomic position. This gives 5 per cent of failures.

To facilitate the study of the 100 cases of retroversion, several charts of summaries are here presented.

Chart I shows a separation of the 100 cases of retroversion, into four classes as follows:

1. Uncomplicated retroversion ..... 5
2. Retroversions and lacerations ..... 6
3. Retroversions, lacerations and intraperitoneal lesions .. 37
4. Retroversion and intraperitoneal lesions ..... 52

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100

Chart I shows that uncomplicated retroversions of the uterus are rare, only 5 per cent of these cases were encountered. The chart also shows

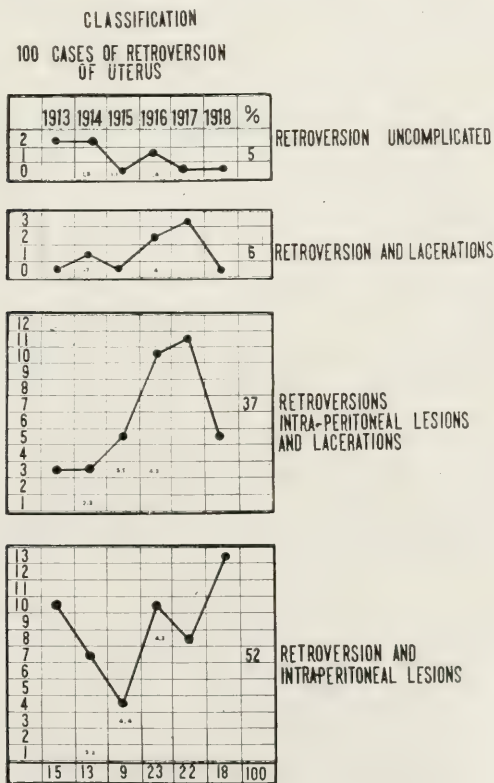


Chart I.

the interesting fact that in 89 per cent of cases the retroversion of the uterus is complicated by a pelvic or an abdominal lesion. Out of 100 cases of operations for retroversion of the uterus only 10 per cent were

free of intraperitoneal lesions. In other words, in retroversion of the uterus, 89 per cent of cases call for a peritoneal incision, to correct conditions other than the displaced uterus.

The uncomplicated cases of retroversion had the following history: three were married but never conceived, two were single, three were over twenty, one over thirty, and one over forty years of age, two cases passed from observation, two cases were successful. In one case the uterus was found in good anatomic position four years after observation.

END RESULTS IN 100 CASES OF RETROVERSION OF UTERUS

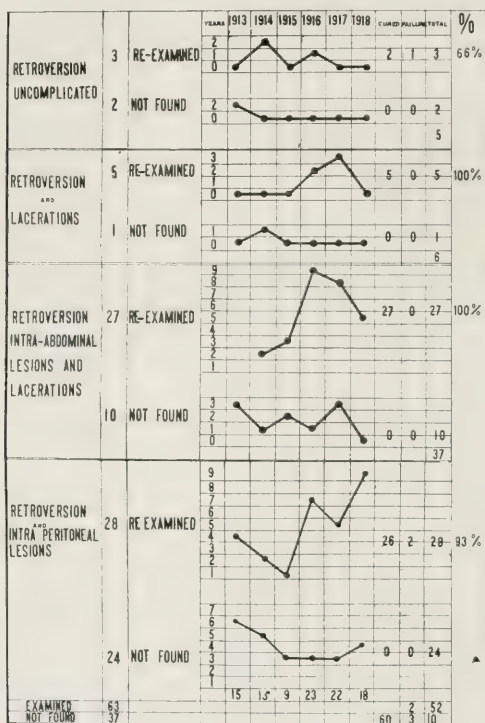


Chart II.

One case was a failure. The history of the case in whom the operation failed is as follows: She was thirty-four years old, married four years with no conception to her credit. On May 12, 1914, operation, dilatation and curettage, Grad shortening of round ligaments. She remained well and free of symptoms for some time. When reexamined March 10, 1917, two years and four months later, the uterus was found retroverted and she was suffering with backache and pain on left side. I am unable to account for the failure of the operation in this case.

Chart II is self-explanatory. It shows the number of cases operated on each fiscal year, the number of cases returned for examination, the

number of cases cured, and the number of failures. It is of interest to note that 43 cases of retroversion were in women who also had lacerations, 37 of this number had also intraperitoneal lesions. Retroversions in the cases of Class 2 and 3 respond well to operative measures and a cure was effected in every case.

Cases in Class 4 were 52 in number. They all suffered from some intraperitoneal lesions in addition to the retroversion of the uterus. After a careful study of these 52 cases I am prepared to say that the cause of their symptoms was to a large extent the malposition of the uterus. Nevertheless, I am also convinced that without operations for the pelvic pathology, the correction of the malposed uterus alone would have spelled failure in many of these cases. The study of these cases justifies the deduction that every case of retroversion with symptoms should have an abdominal section.

Chart III gives a detailed summary of the various operations performed each fiscal year in the 100 cases of retroversion. Altogether 432 operations were performed. There has been no mortality and the mor-

OPERATIONS	8 Cases of Pregnancy	1913	1914	1915	1916	1917	1918	Total
SHORTENING OF ROUND LIGAMENTS (GRAD)		15	13	9	23	22	18	100
APPENDECTOMY		11	7	8	16	15	17	74
DIVULSION AND CURETTAGE		13	5	6	14	11	8	57
VENTRO-SUSPENSION		6	8	5	10	16	11	54
PERINEORRHAPHY		2	2	4	15	11	4	36
REPAIR OF CERVIX		2	2	4	8	6	3	25
SHORTENING OF UTERO-SACRAL LIGAMENTS		0	2	2	8	4	0	16
RESECTION OF OVARY		2	1	0	4	3	3	13
OOPHORECTOMY		2	3	0	0	1	4	10
STEM PESSARY		4	0	0	1	1	1	7
SALPINGECTOMY		2	2	0	2	0	4	10
ANTERIOR COLPORRHAPHY		0	0	0	5	3	1	9
FREEDING OF ADHESIONS		1	1	0	2	2	0	6
VARICOSE VEINS OF BROAD LIGAMENTS		0	2	1	2	0	0	5
MYOMECTOMY		0	0	0	1	3	0	4
RESECTION OF FALLOPIAN TUBES		1	1	1	0	0	0	3
HEMORRHOIDS		0	0	0	1	1	0	2
POST OPERATIVE HERNIA		0	0	0	0	1	0	1
TOTAL		61	49	38	100	100	74	432

Chart III.

bidity in the operation is practically *nil*. Thirty-six operations were done on the uterine adnexa. The appendix was removed in 74 cases.

One hundred seventy operations were performed for retroversion of the uterus. In 54 patients the fundus of the uterus was suspended from the abdominal wall by an intraperitoneal stitch, and the utero-sacral ligaments were shortened up in 16 cases. This latter operation I perform now more frequently than before. These two operations; namely, intraperitoneal ventrosuspension and shortening of the utero-sacral ligaments, supplement the operation of shortening the round ligaments in all cases where there is a laxity of the uterosacral ligaments.



If the fundus of the uterus can be made to approach the abdominal parieties with ease an intraperitoneal suspension stitch is also taken.

Experience has shown that better results are obtained by shortening up the uterosacral ligaments in operating for retroversion of the uterus. In fact at the present time the uterosacral ligaments are shortened up in every operation for retroversion, except in those cases where the technical difficulties, such as very deep pelvis, insufficient exposure, poor relaxation, difficulty with anesthesia, or extreme obesity prevent the operation.

*Pregnancy.*—Chart III also shows the record of eight cases of pregnancy that were encountered in 63 cases reexamined. It shows the kind of operations that were performed in the eight cases that became pregnant after operation.

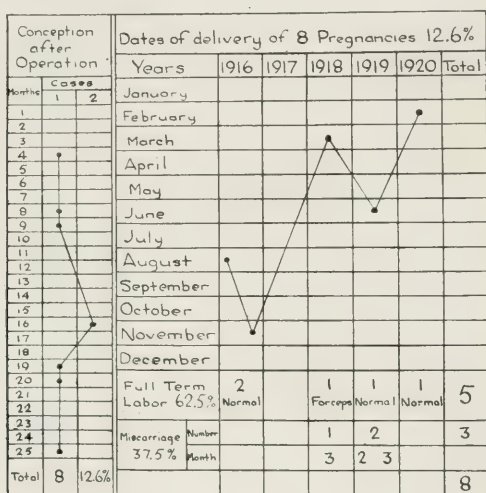


Chart IV.

From the above summary we obtain the interesting fact that in 13 per cent of resection of the ovary, pregnancy occurred twice. In 10 per cent of salpingectomy and 3 per cent resection of the tubes, no pregnancy took place, as far as we know, unless pregnancy occurred in the 37 cases that passed from observation, on whom salpingectomy was done. Disease of the Fallopian tubes is a greater factor in causing sterility than disease of the ovaries, according to these statistics.

Charts IV and V deal with the statistical studies of the eight cases of pregnancy. Chart IV shows that pregnancy occurred in 12.6 per cent of 63 cases reexamined; 62.5 per cent terminated with full term deliveries; one was a forceps case and four were normal; 37.5 per cent terminated by miscarriage, two in the third month and one in the second month. The chart also shows the time of conception after operation in all the eight cases: In one case after four months, in one after eight months, in one

after nine months, in two cases after sixteen months, in the sixth case after nineteen months, in one after twenty months and in one case after twenty-five months.

Chart V shows the summary of the eight cases of pregnancy in detail, three cases were in primiparæ and five in multiparæ. Conception occurred in from 4 months to 25 months after operation. Opportunity offered itself for reexamination of all the cases of pregnancy after delivery or miscarriage. In all the cases examined the uterus was found in good anatomic position. The chart shows the length of time these cases were kept under observation, two cases for three years, four cases for two years and two cases for one year. The various operations performed on these cases are also shown. All the pregnancies occurred in young women below thirty years of age.

LABOR										
OPERATIONS	Hospital Number	Date of Operation		Conception after Operation		Date of delivery		Breast-feeding after delivery		Period of Observation
		Month	Year	Month	Year	Month	Year	Month	Year	Year
D+C Grad Op. Ventral Susp Perineorrhaphy, Shortening Ut Sac Ligaments Appendectomy	11987	4	1914	19	8	1916	3	1917	3	0
Grad Operation Ventral Suspension Perineorrhaphy	15024	10	1915	4	11	1916	3	1917	2	4
D+C Grad Op. Appendectomy Stem Pessary, Resection of right Ovary	17057	9	1916	9	3	1918	12	1918	2	3
D+C Grad Op. Appendectomy Ventral Suspension Cervix + Perineum	18036	3	1917	25	2	1920			2	0
D+C Grad Op. Appendectomy Ventral Suspension Perineorrhaphy	20537	4	1918	8	10	1919	9	1919	1	3
MISCARRIAGES										
D+C Grad Op. Shortening Utero-Sacral Ligaments Trachelorrhaphy	17672	1	1917	16	9	1918	2	1919	2	11
D+C Grad Op. Appendectomy Ventral Suspension Resection of both Ovaries	19756	12	1917	20	10	1919	12	1919	2	0
Grad Op. Ventral Suspension Shortening Ut Sac Ligaments Cervix + Perineum	19801	12	1917	16	7	1919	10	1919	1	10

Chart V.

Case, Hospital No. 20537, is of interest. She was thirty years old, was operated in April, 1918, for retroversion and rectocele. The patient had also a moderate degree of cystocele which was not repaired. She was relieved of all symptoms. Eight months later, she conceived and had a normal labor with a perineal laceration. Eleven months after delivery, examination showed the uterus in excellent anatomic position. The cystocele had increased and the rectocele had recurred. It is to be observed that this patient had passed through pregnancy, sustained a laceration during labor, but the uterus remained in a good anatomic position. In fact in all the five cases pregnancy and labor failed to nullify the success of the operation for retroversion.

Attention is also called to the fact that in none of the cases is there a history of dystocia from the operation. Four out of the five labor cases had also the intraperitoneal ventrosuspension in addition to the short-

ening of the round ligaments. The operation here devised does not create anything abnormal in the pelvis and therefore during labor no disturbance is to be expected from the operation.

*Cases Reexamined.*—Chart VI shows graphically the cases that were

STATISTICS OF 100 OPERATED CASES  
OF RETROVERSION  
RETURNED FOR RE-EXAMINATION

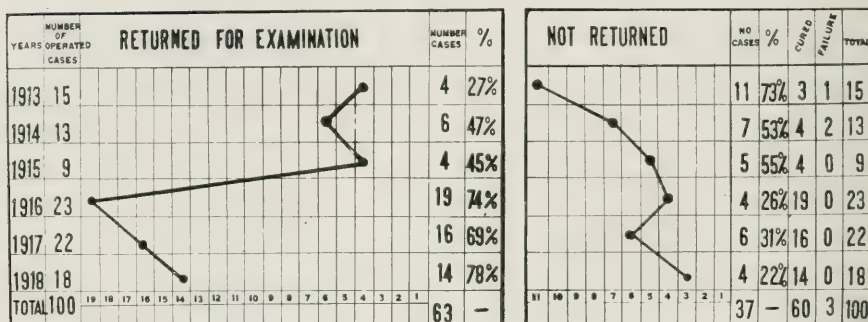


Chart VI.

UTERUS IN GOOD ANATOMIC POSITION  
AFTER OPERATION IN 63 CASES RE-EXAMINED  
CLASSIFIED BY YEARS

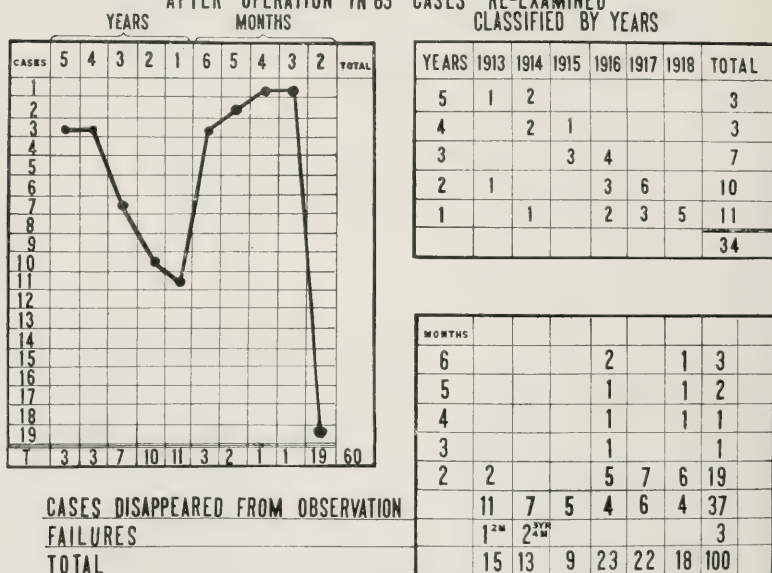


Chart VII.

reexamined and the uterus found in good anatomic position at various periods after operation. Chart VII summarizes the same facts but classifies the cases according to the years in which they were operated. These two charts show that in the 63 cases reexamined, 60 were success-



ful, giving 95 per cent success for the operation. The uterus in all these cases was found in good anatomic position and movable.

In three cases the uterus was found in good position five years after operation. In three cases four years after operation, in seven cases three years, in ten cases two years, and in eleven cases one year after operation. In twenty-six cases the reexamination took place less than six months after operation. Three cases were reexamined six months after operation, two cases five months, one case four months, one case three months and nineteen cases were not examined after the first two months after operation.

The study of the cases reexamined justifies me in making the following deduction; namely, if the anatomic position of the uterus is good at the

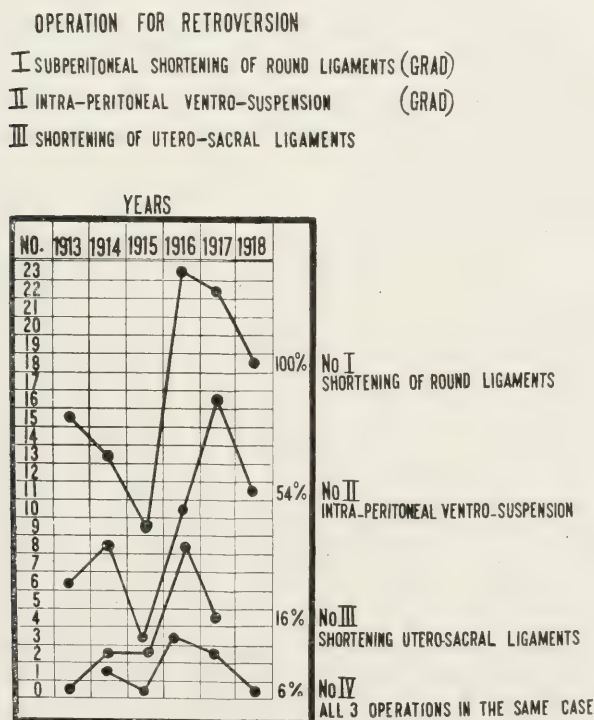


Chart VIII.

end of six or eight months after operation, the uterus will remain permanently in good position, even if pregnancy supervenes. In one case, Hospital No. 15024, the patient was examined two months after operation, on October 15, 1915. The second examination was 21½ years later, in April, 1918. In the meantime she passed through a pregnancy and a normal delivery in November, 1916. The uterus was found in good anatomic position and she was free of symptoms.

Chart VIII summarizes the number of times that the three different

procedures that are recommended in the operation for the correction of a malposed uterus were used. The round ligaments were shortened up 100 times, the intraperitoneal ventrosuspension was used in 54 per cent of cases, and the uterosacral ligaments were shortened in 16 per cent of cases and only in 6 per cent of cases were all the three procedures used in the same case. Today the percentage table is very much changed. The uterosacral ligaments are probably shortened in more than 60 per cent of cases, and instead of 6 per cent, the three operations in the same cases are used more than in 30 per cent of cases.

*Failures.*—In three cases, Hospital No. 12140, 16703, 18087, respectively, the uterus was found retroverted after operation. One of these cases, 12140, has already been described in detail in speaking of the cases of uncomplicated retroversion.

The second case was in a young woman, twenty-two years old, married eighteen months, who was suffering with pain in the lower abdomen and dysmenorrhea since marriage. She was operated on in July, 1916, a dilatation and curettage, shortening of round ligaments and uterosacral ligaments, resection of the ovary, being done. She was reexamined one year and four months after operation when the uterus was found retroverted. She claimed to have been partially relieved of dysmenorrhea. In this case also, as in the previous one, I can give no reason for the failure of the operation.

The third case was seventeen years old, single, suffering with pain in the lower abdomen. In March, 1916, a shortening of the round ligaments, an intraperitoneal ventrosuspension and appendectomy were done. She was relieved of all symptoms and was in good condition in the early part of 1917. On October 23, 1918, examination showed the uterus retroverted and she was also suffering with acute disease of the uterine adnexa. The case is put down as a failure, because the uterus was retroverted. The truth of the matter is, that the patient became infected in the early part of 1917, and developed adnexal disease by October, 1918. She reentered the hospital in November, 1918, and at operation, a tubo-ovarian abscess was found on the right side and a pyosalpinx on the left side. A double salpingectomy and a right oophorectomy were done. The following note was made at the time of operation regarding the previous operation for retroversion. "The round ligaments which had been shortened up at the previous operation were examined and found to have remained shortened and there were no abnormalities about them. There was no evidence of suspension bands between the uterus and abdominal wall from the previous ventrosuspension. The cause of failure of the operation in this case is obvious. She was the victim of a pelvic infection and developed an inflammatory fixation of all the pelvic organs. If this case is excluded from the statistics of failures, the percentage of failures drops from 5 per cent to 3.1 per cent.

In two cases, namely, No. 11334 and 12176, the original symptoms for

which the patient sought relief were not relieved by the operation, although the anatomic results were very good in both cases. In both, the uterus remained in good position and was movable. In one of these cases, No. 1334, there was a double uterus present, the patient suffering with dysmenorrhea and backache. Taking these two cases, unrelieved of symptoms, into consideration I find that the operation gives the following results by percentage:

Retroversion of the uterus, anatomically relieved, 95 per cent.

Retroversion of the uterus, symptomatically relieved, 80 per cent.

I believe that the above figures make a very favorable showing for the operation of subperitoneal shortening of the round ligaments of the retroverted uterus.

*Inspection of Site of Operation.*—Opportunity offered itself for inspection of the field of operation of shortening of the round ligaments and ventrosuspension in three cases, where the abdomen had to be opened for other conditions. The cases were Nos. 11021, 17288, 18087, respectively. Careful notes were taken at the time of reopening the abdomen in all the three cases. Case 11021 was reopened on account of pain in the right ovary. It was a sclerotic ovary and was ablated at the second operation. The following notes were taken at the time the abdomen was reopened: "Median abdominal incision through the old scar, dissection carried down to the fascia and the latter opened up. The peritoneal cavity could only be opened up by cutting through the omentum. The omentum was everywhere adherent to the abdominal incision. The uterus was found in good position. No suspension ligament was found on the fundus. The former operative site for shortening the right round ligament was then inspected. It was found that the ligament appeared perfectly normal and where it was folded on itself a small kernel of tissue was palpable beneath the peritoneum. The same condition prevailed on the left side. This inspection of the ligament was made nearly four years after the first operation.

Case 17288 was reopened for a chronic salpingitis and oophoritis, overlooked at the time of her operation for retroversion. She was operated on November 6, 1916, dilatation and curettage, perineorrhaphy, appendectomy, freeing of adhesions, and shortening of the round ligaments being done. She was reopened on October 13, 1919, two years and eleven months after the first operation. The following notes were taken at the time of operation: "The uterus is in excellent position, a small kernel of thickened tissue under the peritoneum is palpable where the ligaments were folded on themselves."

Case No. 17288 has already been described under the failure cases. Nothing abnormal was visible about the shortened up ligaments and no suspension ligament or band had formed as a result of the ventrosuspension. This case was reopened two years and seven months after the first operation.



*Comment.*—The operation of subperitoneal shortening of the round ligaments of the uterus described in this paper was devised in 1912, and since then modified in many ways. More than two hundred of these operations have now been done. The statistical studies presented here were obtained from the first hundred of these cases. During eight years I have been constantly on the lookout for any possible complication that may arise from this operation. So far I have not come across any such. I cannot imagine how any complication can arise from this operation. No peritoneal spaces are created for any possible intestinal strangulation to occur. No abnormal conditions are created in the abdominal wall. The mesosalpinx is not encroached upon by the operation. The Fallopian tubes cannot become twisted or kinked. The ovaries suffer no disturbance in their anatomic relation. The only structures involved in the operation are the anterior layers of the broad ligaments, to lay bare the round ligaments, the round ligaments themselves, and the fibrous tissue about the internal abdominal ring where the round ligaments emerge from the abdominal cavity.

There are just a few precautions to be observed in performing this operation. After the layers of the broad ligaments are separated and the internal ring of the inguinal canal exposed to a point where the round ligament emerges, it will be found that the external iliac vessels are in the immediate proximity. These vessels must be guarded from injury with the needle in passing the suture for shortening up the round ligaments. Only gross carelessness can possibly injure them. In grasping the fibers of the ring with the needle, the circumference of the ring pointing towards the abdominal parietes is to be taken into the grasp of the needle and not the lateral edge of the ring. By doing this there is no possibility of injuring the vessels which are exposed and constantly in sight.

The next precaution to observe is to shorten up the ligaments to a desired degree, but not to make them too tense. The mesosalpinx should not be traumatized. This is easily avoided as these delicate structures are fully exposed and constantly under the eye. There are no difficulties encountered in the operation, it is a straightforward surgical procedure.

Having done this operation repeatedly, I feel assured that those who will give the operation a trial will be pleased with the simplicity of the technic, with the ease and rapidity of application, and with the excellent results that follow this method of shortening the round ligaments of the uterus.

#### CONCLUSIONS

1. Every case of retroversion of the uterus with symptoms requires an abdominal section.
2. The operation of subperitoneal shortening of the round ligaments of

the uterus is one readily performed along definite surgical lines by a definite technic.

3. It is not a time-consuming operation, a very important consideration.

4. It creates no abnormal conditions in the pelvis or pelvic viscera.

5. It tunnels no holes through the abdominal parietes.

6. It causes no intraperitoneal or intrapelvic complications.

7. It causes no complications during pregnancy or labor.

8. The operation is devoid of mortality or morbidity.

9. The final results of the operation show 95 per cent of successes, a very creditable showing, which compares well with any of the standard operations now in use for retroversion of the uterus.

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40 EAST FORTY-FIRST STREET.

(For discussion, see page 530.)

## A PRELIMINARY REPORT ON PYELITIS IN PREGNANCY WITH REPORT OF CASES\*

BY GREER BAUGHMAN, M.D., F.A.C.S., RICHMOND, VA.

THE three cases of pyelitis in pregnancy to be reported, were selected because they were studied over a considerable period of time; they present certain features in common that are rather characteristic of the condition and, at the same time, are sufficiently varied to make them interesting. All of them were treated with pelvic lavage; pyelograms being taken from time to time as the pelvic size changed, provided the condition of the patient warranted this added discomfort. All were private patients treated at a private hospital.

So insidious is pyelitis in its onset, frequently giving rise to no local symptoms and causing no temperature, that one is often puzzled to find the cause of the malaise, headache, and nausea of which these women complain. The proper diagnosis is, however, very important; because an untreated pyelitis can be the predisposing cause of an abortion or a premature labor. That is serious enough; but when we remember that even after delivery the pyelitis usually persists, infecting the kidney, reducing its function, or crippling it entirely, then pyelitis of pregnancy must be classed with the more serious complications of gestation.

Since Kaltenbach, 1871, showed the connection between pyelitis and pregnancy, more or less interest has been taken in the subject. The question of the method of infection, whether it be by way of the lymphatics, the blood stream, or ascending from the bladder, has produced a great deal of discussion.

Neisser, Opitz and Foltin showed that the healthy intestine would not allow the bacillus coli to pass through its wall. Folin demonstrated that to produce a pyelitis it was necessary to tie off both rectum and ureter, but that the simple occlusion of the urethra was sufficient to produce a cystitis.

Whatever our judgment as to the method of bacterial invasion, all are agreed that obstruction to the ureter is the predisposing cause, as was experimentally shown by Mirabau, 1907, when he found a pyelitis on the side that was tied when bacilli coli were injected into the ear of a guinea pig. It is interesting to note that Carl Franke, 1915, found a direct lymphatic connection between the rectum and the right kidney.

While not denying the fact that the enlarging uterus itself, twisted to the right as it usually is, may be a decided factor in pressing upon

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.



the ureter and causing dilatation with stagnation, certainly in the later months of pregnancy the presence of the presenting part in the pelvis, particularly if the patient be constipated, is the main predisposing cause of pyelitis by making direct pressure upon the ureter as it passes over the brim of the pelvis.

In the treatment of pyelitis drainage seems to be the one important thing. The method of drainage has to be determined with each case. In some the giving of large amounts of hexamethylamine water is sufficient to overcome the obstruction, particularly if a posture is found that will remove the obstruction. Many cases will respond to pelvic lavage with drainage by means of a pelvic catheter. In some cases we are faced with the necessity of a nephrostomy, inducing abortion or premature labor. Of course rest in bed in such a manner that the best drainage may be obtained, proper diet, and attention to the bowels must not be overlooked.

CASE 1.—Mrs. J. M. C., 546. White; aged twenty-five; iii para; 5 feet 7 inches tall; weight, 109 lbs. *Personal History*: Measles and typhoid during childhood. Menstruates every twenty-six days; duration, five to six days; no pain or

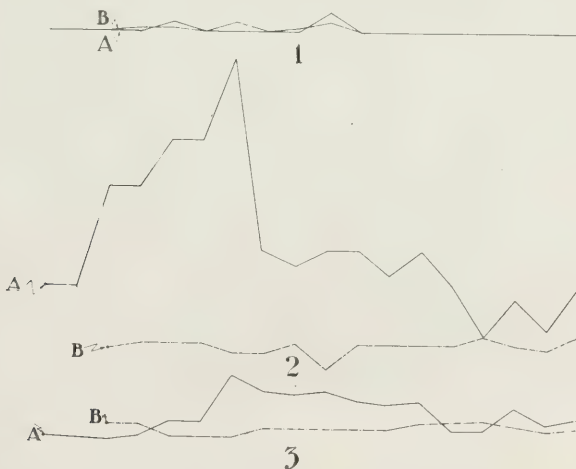


Fig. 1.—Mrs. J. M. C.—1-A. Represents the curve of bacteria found in the bladder upon the days of treatment. (B. coli.)

1-B. Represents the quantity of pus found in the bladder upon the days of treatment.

2-A. Represents size of kidney pelvis of the right side upon the days of treatment, the normal size of 10 c.c. being taken as standard.

2-B. Represents the kidney function of the right side upon the days of treatment, the normal function being taken as 15.

3-A. Represents size of kidney pelvis of the left side upon the days of treatment, the normal size of 10 c.c. being taken as standard.

3-B. Represents the kidney function of the left side upon the days of treatment, the normal function being taken as 15.

Labor was induced after the fifth treatment.

excessive flow. One abortion at third month in fall of 1916; cause not known. Wassermann, negative. First labor induced by Voorhees bag as pregnancy was prolonged. Labor uneventful; duration thirteen hours. Vulval tear; immediate catgut repair. Puerperium normal. Pelvic measurements normal. During the second full-term pregnancy she had a slight bleeding, July 16. Quickening, De-

ember 9. Nausea slight, but persistent for the first five months. Urine normal until February 23, 1920, when nausea became very bad. Vomiting very persistent. Pain over abdomen and back, with the greatest tenderness over right kidney. No elevation in temperature. Catheterized urine was acid and contained a few pus cells.

*Diagnosis:* Acute pyelitis, right side. She was referred to Dr. Joseph F. Geisinger for cystoscopic examination and treatment. (The chart (Fig. 1) gives a graphic account of the results of the cystoscopic findings.) In spite of the fact that the condition of the kidney pelvis showed no improvement, her clinical condition improved. The almost complete anorexia, present at first, was followed by an increased desire for food. At the fifth irrigation it was decided that the patient was in sufficiently good condition to justify the taking of a bromide pyelogram. The report, made by Dr. F. M. Hodges, showed that there was great

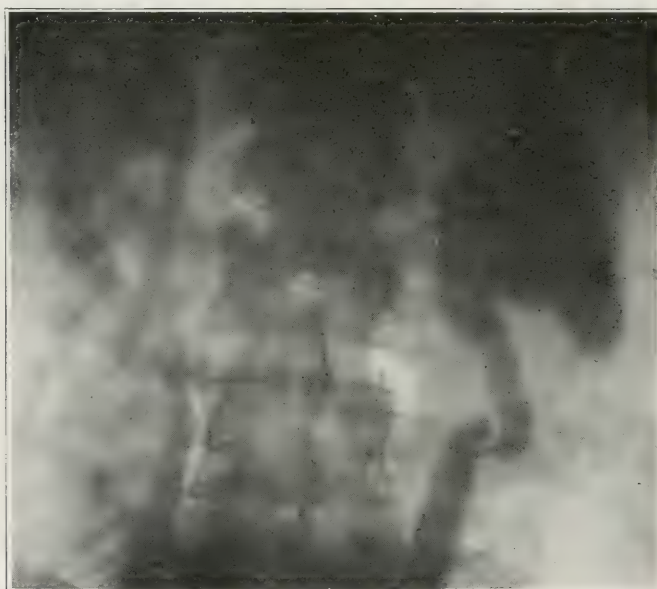


Fig. 2.—Mrs. J. M. C. 8-546. Bromide pyelogram. Mar. 18, 1920. Great distention of right pelvis and ureter; moderate distention of left pelvis and ureter. Both ureters kinked and tortuous.

distention of the right kidney, pelvis and ureter, and moderate distention of left pelvis and ureter. Both ureters were kinked and tortuous.

At the sixth irrigation it was noted that the patient had suffered a great deal after the last irrigation; she was not eating so well, and had considerable nausea. As the calculated date of delivery was April 4 and the child viable, it was decided to induce premature labor. March 27 was the day selected for this purpose, as it had been found that the patient usually did better for four days after the irrigations. At 6:30 P.M. a bougie was introduced. Twenty-four hours later, labor not having started, the bougie was removed and a Voorhees bag introduced after manual dilatation of the cervix. Labor began shortly thereafter. The bag was passed at 6:30 A.M., March 29, and at 8:30 A.M. a girl was born; weight, 6 lbs., 4 oz., and 49 cm. long. The child is alive, breast-fed, and unusually healthy. No temperature during the puerperium.

Five irrigations were given after delivery; the first, fourteen days after de-

livery. The clinical condition of the patient was markedly improved. On April 22, a cystitis developed, which was treated by daily bladder irrigations followed by mercuricrome instillations. July 8, a catheterized specimen proved negative for pus or casts. Vaginal examination shows uterus and appendages normal. She has gained nine pounds in weight, and is feeling fine.

CASE 2.—Mrs. R. C. H.—8-132. White, aged twenty-six; primipara; 5 feet 3½ inches tall; weight, 107 lbs.; family history negative. *Personal History*: All infantile diseases. Diphtheria at ten. Develops urticaria when she takes quinine. Menstruates every 28 days; duration 4 to 5 days; no pain. Last menstruation June 1 to 5, 1919; quickening November 11, 1919; probable date of delivery March 7, 1920. Had a slight painful bleeding from the uterus November 15, 1919. Fetal movements continue vigorous. November 14, severe pain in back and right side; since that time has had temperature reaching as high as 104° F. Urination frequent, accompanied by burning sensation. Had a chill the morning of November 19, the day I first saw her, and two other chills the same day. Evening temperature 101°; leucocytes 16,000; polynuclear 90 per cent. Urine acid; trace of albumin; sp. gr. 1.018; a few pus cells and kidney epithelium. During the acute attack she suffered with nausea. *Diagnosis*: acute pyelitis, right side. The case

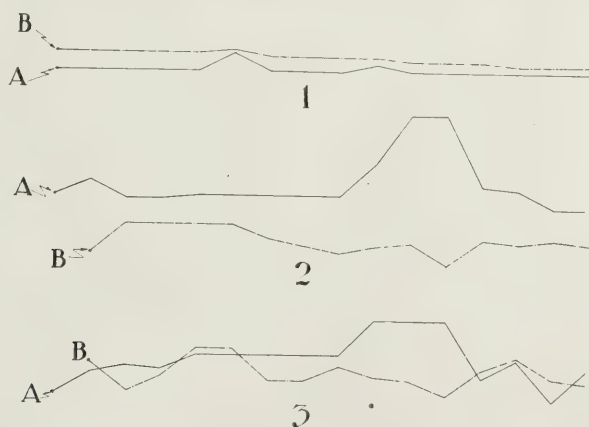


Fig. 3.—Mrs. R. C. H.—1-A. Represents the curve of bacteria found in the bladder upon the days of treatment. B. coli were found except upon the thirteenth, fourteenth and sixteenth treatments, when staphylococcus albus was found.

1-B. Represents the quantity of pus found in the bladder upon the days of treatment.

2-A. Represents the size of the right kidney pelvis upon the days of treatment, 10 c.c. being taken as the normal.

2-B. Represents the kidney function of the right side upon the days of treatment, the normal function being taken as 15.

3-A. Represents the size of the left kidney pelvis upon the days of treatment, 10 c.c. being taken as the normal.

3-B. Represents the kidney function of the left side upon the days of treatment, the normal function being taken as 15.

She entered into labor after the twelfth treatment.

was turned over to Dr. Joseph F. Geisinger for cystoscopic examination and treatment.

After the first three bladder irrigations the patient was improved decidedly, having but slight reaction, but the fourth treatment was followed by much nausea for two days. The fifth treatment was done with mercuricrome, succeeded by very little reaction. It was possible to make bromide pyelograms at the sixth treatment.

December 15, Dr. F. M. Hodges reported upon the bromide pyelogram that



the left pelvis and ureter were moderately distended; the right pelvis and ureter, though not completely filled, were more dilated than the left. Kink in ureters below pelvis, but dilated below that point. Vertebral column of fetus to the right: its position probably interfering seriously with the emptying of the kidney pelvis on that side.

At the next irrigation the general appearance of the patient was improved. She had very little reaction from the pyelogram. At the ninth irrigation it was noted that the right kidney pelvis failed to empty itself until aided by manipulation over the kidney region. At the next irrigation it was determined, the child being viable, that labor should be induced January 31. A bromide pyelogram was made and reported upon by Dr. F. M. Hodges, January 13. Fetus well shown. Moderate dilatation of both kidney pelves, marked on the right where there is distinct clubbing



Fig. 4.—Mrs. R. C. H. 8-132. Jan. 13, 1920. Bromide pyelogram. Fetus well shown. Moderate dilatation of both kidney pelves, marked on the right where there is clubbing of the calyces. Distorted ureters in the upper part; not so much dilatation below.

of the calyces. Distorted ureters in the upper part; not so much dilatation below. Clinical condition good. Very little reaction followed the last irrigation. At the twelfth irrigation, January 19, it was noted that the patient suffered considerably during the examination. She was irrigated with 2 per cent silver nitrate solution, and, contrary to advice, went home immediately after the irrigation. She had a restless night. Labor began at 7 A.M., January 20. She was hurried to the hospital. Examination revealed complete dilatation of the os at 9 A.M. and delivery occurred at 1:40 P.M. the same day. The baby was born asphyxiated and could be resuscitated with difficulty only. The child died at 6:15 P.M. The mother sustained a fourchette tear which was immediately repaired. There was no temperature during the puerperium.

January 31, eleven days after delivery, the lavages were started again. Very slow flow of urine, especially from the right side, was noted. It was necessary to use pressure upon the kidney to cause complete evacuation of the pelvis. Clinical

condition very good. At the next irrigation there was a fairly free flow of urine; but the right pelvis was evacuated only after pressure upon the pelvis from behind. There was no effect upon the flow of urine with the patient in the sitting posture.

February 23, a bromide pyelogram was made by Dr. F. M. Hodges. Ureters now practically normal in size, and there was no kinking of them. Left pelvis well filled and normal in size. Right pelvis only partially filled; solution has accumulated in the calyces. He thinks that the general kidney shadow on the right side is smaller than normal. He also believes that the right kidney may be smaller than normal, accounting for the continued reduction of function on that side. Clinical condition of patient very good. At the irrigation on March 11, it was noted that the patient complained of some pain in passing No. 10 catheter. There was a free flow of urine from both sides. Clinical condition excellent.



Fig. 5.—Mrs. R. C. H. 8-132. Feb. 23, 1920. Bromide pyelogram. Ureters now practically normal in size, no kinking of the ureters. Left pelvis well filled, normal in size. Right pelvis only partially filled, solution has accumulated in the calyces. The general kidney shadow on the right side is smaller than normal. The kidney may be smaller than normal accounting for the reduction in function on that side.

CASE 3.—Mrs. J. T. D.—7-2172; white; aged 24; ii para; 5 ft., 3 in. tall; weight, 125 lbs.; family history negative. *Personal History*: Had all of the infantile diseases. One child, three years old. Normal delivery. No complications. Menstruates every 28 days; duration, 7 days; no pain. Last menstruation March 1 to 8. Quickening June 27. Probable date of delivery, December 6, 1919. Patient was first seen in consultation with Dr. Joseph Bear, October 16, 1919. She was then suffering from severe nausea and vomiting for a period of ten days. She complained of pain in her abdomen and back. There was great tenderness over both kidneys, particularly the right. Catheterized specimen of urine was acid in reaction, showed some pus and a few red blood cells. Temperature, 101. Temperature had been continuous for three days. There was considerable mucus in the stools. *Diagnosis*: Pyelitis, right side, with possible involvement of the left kidney. She was moved to the hospital and turned over to Dr. J. F. Geisinger for treatment.

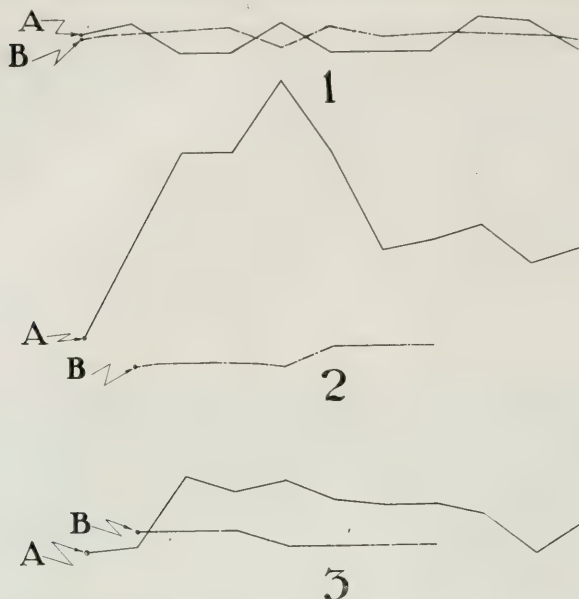


Fig. 6.—Mrs. J. T. D.—1-A. Represents the curve of bacteria found in the bladder upon the days of treatment (*Staphylococcus albus*).

1-B. Represents the quantity of pus found in the bladder upon the days of treatment.

2-A. Represents the size of the right kidney pelvis upon the days of treatment, 10 c.c. being taken as normal.

2-B. Represents the kidney function of the right side upon the days of treatment, the normal function being taken as 15.

3-A. Represents the size of the left kidney pelvis upon the days of treatment, 10 c.c. being taken as normal.

3-B. Represents the kidney function of the left side upon the days of treatment, the normal function being taken as 15.

Labor was induced after the seventh treatment.



Fig. 7.—Mrs. J. T. D. 7-2172. Dec. 1, 1919. Bromide pyelogram. Marked dilatation of right pelvis and ureter, but smaller than the last examination. Kink in right ureter near pelvis. Left ureter also distended, as well as the pelvis, but the calyces are normal.



Examination at the hospital showed hemoglobin 60 per cent; leucocytes 8000; polynuclears 72 per cent; large mononuclears 10 per cent; lymphocytes 18 per cent. The result of the cystoscopic examination added to the diagnosis of pyelitis hydro-



Fig. 8.—Mrs. J. T. D., 7-2172. Dec. 9, 1919. Bromide pyelogram. Left side about the same, but the right side shows definite signs of improvement.



Fig. 9.—Mrs. J. T. D., 7-2172. Dec. 18, 1919. Bromide pyelogram. Left ureter and pelvis moderately distended, right pelvis and ureter though not completely filled, more dilated than the left. Kink in ureters below pelvis, but ureters dilated below that point.

nephrosis. Following the first irrigation the patient's nausea and vomiting improved very much. The improvement continued after the second irrigation. The result was similar after the third; but she began to have sweats. At the fourth irrigation,



Fig. 10.—Mrs. J. T. D. 7-2172. Feb. 2, 1920. Bromide pyelogram. Pelves and ureters almost normal.



Fig. 11.—Mrs. J. T. D. 7-2172. April 26, 1920. Bromide pyelogram. Pelvis and ureters practically normal.

a bromide pyelogram was taken, but the plates did not show the pelves. At the fifth irrigation a successful bromide pyelogram was made by Dr. F. M. Hodges, which showed enormous dilatation of the right pelvis and ureter. The left pelvis proved normal. General condition of patient excellent; she eats well, but has an occasional vomiting spell. Following the taking of the pyelogram she had a recurrence of nausea, vomiting and headache, though not so severe as when she was brought to the hospital. The catheter was left in the right pelvis for two hours after the irrigation of November 17. It was noted that the nausea, vomiting, and headache were much better since the last irrigation. As the child was now viable, and as the left pelvis had begun to dilate, it was decided to induce labor.

At 9:30 P.M. a Voorhees bag was introduced. Since labor had not started, a bougie was also inserted. Labor began at 11:30 P.M. The bougie was passed, and at 12:7 A.M., November 19, a boy was born; weight, 7 lbs., 12 oz.; length, 48 cm. The baby thrived and is well. No temperature during the puerperium.

Fourteen days after delivery she was irrigated and a bromide pyelogram was made by Dr. F. M. Hodges. He reported a marked dilatation of the right pelvis and ureter, but smaller than at the last examination. Kink in right ureter near the pelvis. Left ureter and pelvis also distended, but the calyces are normal. She was allowed to go home on December 2. There was some reaction from the last irrigation. On December 9, a bromide pyelogram was made. It showed the left side about the same as before, but the right side showed definite signs of improvement. Clinical condition good. On December 18, another bromide pyelogram was made. Right pelvis well filled, slightly smaller than at the last examination. The calyces are practically normal. Ureter and pelvis still dilated. Patient had a recurrence of sweating. Pelvic examination showed everything normal and nothing to account for the sweating. She is gaining weight. December 31, a bromide pyelogram was made again, but the plate was poor. However, both pelves were well filled, and both showed marked improvement. Clinical condition excellent. February 2, a bromide plate was made which showed the pelves almost normal in size. April 26, the condition of the patient is excellent. She said that she felt the catheters every inch of the way.

#### SUMMARY

1. In all of the cases the right pelvis was principally involved.
2. In the first two cases the bladder was early and persistently involved. In the last case the bladder was occasionally inflamed.
3. In the first two cases the colon bacillus was the exciting cause. In the last case the staphylococcus albus.
4. In all of the cases the curve representing the sizes of the right and left pelves is almost parallel.
5. The symptoms in all cases improved under irrigation.
6. The most marked improvement was noted following delivery in all of the cases, showing that the obstruction was due to the uterus and its contents.
7. The fact that the right kidney of the second case is congenitally small will account for the continued reduction of function upon that side.
8. There was noted a compensatory increase in function upon the side that was less involved.



9. It was possible to irrigate these cases within two weeks after delivery.

10. None of the cases had any temperature during the puerperium.

11. Even in enormous dilatations, as in Case 3 where the pelvis held 100 c.c., a cure is possible.

12. Living babies were born in the cases upon which labor was induced at the selected time; while the case that entered labor before the time set for the induction of labor, gave birth to a dead child.

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26 NORTH LAUREL STREET.

(For discussion, see page 526.)

## THROMBOPHLEBITIS DURING THE PUERPERIUM FOLLOWING INFLUENZA, WITH A REPORT OF CASES\*

BY LEWIS F. SMEAD, M.D., TOLEDO, O.

THE present interest in septic pelvic puerperal thrombophlebitis arose when it was suggested that the pyemia, which makes the disease so serious, might be prevented by surgical intervention. In other fields of surgery, as early as 1784, John Hunter had successfully treated a case of pyemia by ligating the saphenous vein; and in 1884 Zauful had ligated the internal jugular vein for lateral sinus thrombophlebitis. In 1898 Freund suggested that, as in certain cases of fatal puerperal infection the only lesion present was a thrombophlebitis of the spermatic veins, the ligation or excision of these vessels would be a practical operation. Sippel in 1894, and Lusk in 1896, had already suggested hysterectomy with the excision of the thrombosed veins as a method of dealing with the condition. In 1902 Trendelenburg reported the first successful ligation of the pelvic veins for thrombophlebitis, and it was his paper, together with one by Bumm, that stimulated the interest in this subject.

Since the report by Trendelenburg many exhaustive papers have been written on pelvic thrombophlebitis, attempting to establish the diagnosis, determine the indications for operation, and, by comparison of operative and nonoperative results, to decide the question of surgical intervention. As yet, however, the number of operative cases is too small to make a final conclusion possible.

Pelvic thrombophlebitis, following childbirth, is more common than is ordinarily realized. It has been found in from 30 to 50 per cent of cases dying of puerperal infection. There are many reasons why this condition should be frequent in the puerperium. The blood current is slowed in the pelvic veins and in the veins and sinuses of the uterus, because the large vessels of pregnancy have less to do in the puerperium and also because the woman is quiet in bed and is weak and anemic after her delivery. Some of the veins are even filled with clots or thrombosed. This is especially true in a subinvolved uterus. The increased viscosity of the blood and the high platelet count of pregnancy, also favor thrombosis. The traumatized pelvic veins and the open, torn uterine sinuses are especially susceptible to thrombophlebitis.

The determining factor in thrombophlebitis, however, is the infection which enters, as a rule, through the placental site, but also through tears in the cervix and vagina and, probably, not uncommonly by the

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.

general circulation from such foci as infected teeth, tonsils, and air passages. The infecting organism is nearly always the streptococcus. In general we may speak of two types of puerperal thrombophlebitis: the acutely virulent, rapidly progressing type and a less virulent, subacute, slowly extending one. The acute infection goes rapidly along the interior of the blood vessels as an acute phlebitis. It proceeds more rapidly than the thrombus formation, reaches the general circulation, and quickly produces a fatal septicemia. The subacute infection also extends as a phlebitis, but is preceded by a thrombosis, which delays or blocks its progress. These patients have a better chance than those suffering with the acute variety; however, the mortality is very high. In thrombophlebitis the infection begins in the torn, open, venous sinuses of the placental site and extends through the veins of the uterus to the pelvic veins, whence it goes by the ovarian, uterine, median, or smaller veins to the vena cava and general circulation. In the less virulent cases the infection is delayed or entirely blocked by the thrombus formation, which has preceded the infection and is in this case a conservative process.

In a large percentage of cases, however, the infection works by the softening thrombus and, along with bits of the thrombus, escapes into the circulation, producing rapid rises in temperature, chills, and metastatic foci in the lungs and other organs. Strangely, however, massive, suddenly fatal, pulmonary emboli are rare in puerperal thrombophlebitis. Later in the course of the disease the infection breaks through the vessel walls, producing a perivascular lymphangitis and not infrequently a localized collection of pus. Abscess formation within the walls of the uterus is also a common complication.

The clinical picture of uncomplicated, pelvic thrombophlebitis is quite characteristic. The temperature is the most reliable symptom. As in lateral sinus infection, it rises suddenly from normal to 105°F or 106°F and, in a short time, falls to slightly above or below normal, where it remains until the next sudden rise. During the high temperature the patient looks flushed and ill, but during the remission it is hard to believe that she is not entirely well.

The characteristic temperature is frequently preceded, for a few days, by a low grade fever.

Severe, prolonged chills are present in the majority of cases. Not infrequently, however, they are few or entirely absent. Their early appearance is supposed to indicate a grave prognosis. Their disappearance is said to indicate an early recovery. Fatal cases, however, may occur without any chills.

The pulse rate fluctuates with the temperature, but is relatively low until the patient begins to suffer from severe sepsis, the result of the development of metastatic foci or of extensive abscess formation about the veins or of septicemia.



The blood cultures are as often negative as positive. Cultures taken near the time of a chill or sudden rise of temperature are more often positive. The occasional negative or positive blood culture is not of prognostic value; however, the constant presence of a positive culture is of serious moment.

The prolonged course of this disease, lasting for months, is quite characteristic. Even without complications it may last for many weeks. The onset of the symptoms typical of thrombophlebitis may be within the first few days after delivery, but it is more often early in the second week.

In phlebitis of the pelvic veins pain is usually absent. Slight tenderness about the involved veins is the rule. When the infection breaks through the vein walls, pain and tenderness are of course present. The thrombosed vessels can usually be palpated at some stage of the disease. This is especially true when the uterine veins are the seat of trouble.

When the ovarian veins are involved, they frequently cannot be palpated. In the early, acute cases the thrombosed veins can less often be discovered. In the early stages of thrombophlebitis the uterus is usually subinvolved, and there may be some abnormal discharge in which the streptococcus is commonly found. Later, in the chronic cases, the uterus is small and firm. Aside from some edema on the side involved, the tubes and ovaries are normal. Peritoneal symptoms, if present, are due to the complications or sequela of thrombophlebitis, not to the disease itself. Retrograde involvement of the femoral veins, with swelling of the legs, is a sign of extensive involvement and usually indicates a hopeless condition.

Many men question whether there is a symptom complex by which pelvic-thrombophlebitis can be diagnosticated with reasonable accuracy. The extensively fluctuating, hectic temperature, frequent, severe chills, sharply defined, slightly tender masses in the region of the pelvic veins are convincing evidence of thrombophlebitis. Even if the chills are absent and no thrombosed vessels are palpable, yet the peculiar temperature and the patient's unusually normal condition between temperature rises are very suggestive symptoms, if the uterus and adnexa are free from inflammation. The prolonged course of the disease is also very characteristic.

In septicemia the temperature fluctuates less, chills are not so common, the patient appears ill all the time, the pulse is higher, and blood cultures are more constantly positive. In pelvic lymphangitis the induration is more extensive, not sharply defined, and very tender and painful. The course of the disease is less chronic, and the mortality relatively low. A small area of lymphangitis of a chronic type is difficult to distinguish from a group of thrombosed pelvic veins.

A puerperal thrombophlebitis in the veins outside of the pelvis is indistinguishable from the same condition in the pelvic veins, so far as

symptoms are concerned. Not infrequently an infection passes by the pelvic veins and involves the iliac veins or the vena cava, primarily, just as it does so commonly the femoral vessels.

The prognosis in puerperal thrombophlebitis is not good. In the non-operative cases the mortality is estimated from 50 to 100 per cent. Sanes gives it as 51.6 and Brettauer as 47.5 per cent. Miller gives the gross mortality of the operative cases as 51.6 per cent and the corrected mortality, after leaving out the perfectly hopeless cases that never should have been operated, as 33.9 per cent. Williams thinks that early cases, involving the ovarian vein alone, should not give an operative mortality of more than 10 per cent.

Undoubtedly, if we perfect our means of diagnosis and are on the lookout for these cases, we will not only get them earlier, but we will recognize some of the milder ones. This will improve the mortality rate of the nonoperative cases as well as the operative. It is not quite fair, it seems to me, to charge all the advanced, severe cases of the past to the nonoperative mortality record and to correct the operative record by omitting all the bad cases and including the early and mild ones. Interest in the treatment of septic puerperal thrombophlebitis has been chiefly surgical since 1902.

Prophylaxis consists of intelligent, modern obstetrics, with careful asepsis, complete evacuation of the uterus, good drainage, a minimum amount of traumatism, and as little hemorrhage as possible. In the puerperium it is important that the circulation be kept as active as possible by good food, fresh air, heart stimulation if necessary, and getting the patient out of bed as early as is reasonable.

The nonsurgical treatment consists in general measures to keep up the body resistance, good food, abundance of fresh air, and the avoidance of anything which may dislodge the thrombus—such as douches, enemata, and pelvic examinations. Vaccine and serum treatment has been disappointing.

The surgical treatment has consisted in the ligation or excision of the involved veins and in the drainage of perivascular abscesses. The transperitoneal route has proved better than the extraperitoneal or vaginal approach. The question of whether to ligate or to excise the involved veins has been more difficult for the profession to decide. Opinion, however, seems in favor of ligation, unless rupture of a vein filled with pus seems likely or perivascular abscess actually exists. Excision or simple drainage then is advocated. In thrombophlebitis of the internal iliaes or median iliac veins, ligation is the only procedure anatomically possible; but with the ovarians either excision or ligation can be done. If the operation is performed early in the disease, when other vessels are likely to become involved, all the cardinal veins must be ligated. In the late stages of the more chronic form of the disease one may be content to ligate only the vessels on the side diseased.

Baldwin, with excellent results, has done complete hysterectomy for thrombophlebitis of the pelvic veins. He ligated the arteries only, left the proximal ends of the veins open for drainage, filled the pelvis with gauze, and drained by the vagina. His cases were desperate ones, containing abscesses in the uterine walls. The profession has not accepted hysterectomy in the treatment of simple thrombophlebitis of the pelvic veins, but in cases with abscesses in the uterine walls should be carefully considered.

The common iliac veins and even the vena cava have been successfully ligated and without giving rise to gangrene or even much edema. Most of the patients, however, died because the infective process could not be stopped, but they lived long enough to prove the ligation itself not to be so serious.

Those who favor the surgical treatment of thrombophlebitis assert that an accurate diagnosis can be made, that in the early cases the pathology is limited to one side of the pelvis and even to one ovarian vein in many cases, that ligation does arrest the progress of the disease if not too far advanced, that the operation at least does no harm, that the nonoperative mortality of 52 per cent can be reduced to 30 per cent or less by operation, and that a long, exhausting illness can be avoided.

Those who are opposed to major surgery in thrombophlebitis argue that the diagnosis is not accurate, that usually the disease cannot be recognized until cure by operation is impossible, that interference in early cases will result in many unnecessary operations, that ligation frequently does not arrest the disease even in the vein involved, that it is impossible to ligate all veins by which infection may extend, that the disease often involves higher veins without involvement of the pelvic vessels, that fatal metastatic foci may exist at time of operation and be unrecognizable, that any major operation is serious for such patients, that the operative mortality is little less than the nonoperative, that there is serious danger in manipulating such virulent infections, that the thrombosis is a strictly conservative process not to be disturbed.

It is generally agreed that it is useless to operate pelvic thrombophlebitis if serious metastatic foci exist, if there is a constant bacteremia or septicemia, if pelvic cellulitis, marked peritonitis, or extensive perivascular abscesses are found, and especially if the thrombophlebitis has involved the vena cava. It is impossible to say just what cases of thrombophlebitis should be operated, and harder still to choose the best time for operation. The ultra acute cases, certainly, are not suitable for operation. The subacute or chronic cases, however, offer some chance of cure. The number of chills cannot be used as a guide in choosing the time for operation. If, after the first acute onset, the symptoms settle down to a definite, typical course; if there are no serious complications; if the patient is not improving but rather losing, operation



should be considered. However, great conservatism must be the rule in considering a major operation on the infected puerperal woman.

#### CONCLUSIONS

1. Puerperal pelvic thrombophlebitis is more common than is ordinarily realized.
2. The diagnosis can be fairly accurate.
3. The source of the infection may have a distant as well as a local origin.
4. The results of surgical treatment are probably slightly better than the nonoperative.
5. The indications for operation are difficult to determine.
6. The greatest conservatism must govern the choice of cases for operation.
7. The majority of cases should not be operated.

The following cases were seen in consultation:

CASE 1.—On Jan. 25, 1920, Mrs. N. G. R., aged twenty-three, a vigorous primipara was delivered of a healthy child. Her pregnancy had been entirely normal and free from any unusual vaginal discharge or infection of the urinary tract.

Labor lasted eleven hours, no instruments were used, and there was no unusual hemorrhage. Chloroform was given for three quarters of an hour, and three vaginal examinations were made without gloves.

The delivery took place during an influenza epidemic and the baby and the grandmother suffered from the disease.

On the third day of her puerperium the patient had a sudden rise of temperature to 105, with headache, cough, and coryza. The fever varied from 100° to 104.5° F. for twelve days. A diagnosis of influenza was made.

For five days the patient had a low grade fever from 98°-100°. There was some discharge from a slowly-involuting uterus.

On the twentieth day of her puerperium the patient had a sudden rise of temperature to 102° and for 36 days she had a suddenly fluctuating temperature from 99 to 104.5°. There were a few slight chills and many profuse sweats at the periods of high temperature.

During a good part of each twenty-four hours the temperature was normal, and at this time the patient looked and felt well, and her appetite was good.

At no time during the first five weeks of the illness could any pathology be found in the uterus, adnexa, or pelvic veins. The uterus involuted well, and no pain or soreness was present in the pelvis or abdomen.

In the sixth week soreness, pain, and induration appeared in the lower abdomen at the outer end of the right broad ligament. A cord-like thickening from the uterus to the mass in the right lower abdomen could be palpated by the vagina. An extra-peritoneal abscess was opened by an abdominal incision, and one ounce of thick pus, containing a pure culture of pneumococcus, evacuated.

The temperature then became normal for ten days only to be followed again by a temperature typical of thrombophlebitis, after which another abscess developed and opened spontaneously. After some fluctuation the temperature became permanently normal.

There were no metastatic foci at any time. The whole course of the disease was

a little more than one hundred days. The patient became quite anemic, but her condition never was extremely bad. At present she is perfectly well.

The diagnosis in the case is thrombophlebitis of the right ovarian vein with perivascular abscess.

CASE 2.—Mrs. E. W., aged thirty, the mother of one child, was delivered of a normal infant on March 10, 1920. Pregnancy had been normal, and she had had no abnormal vaginal discharge.

Labor was short, no instruments were used, and no internal examination was made. Chloroform was given for ten minutes. There was no hemorrhage and no lacerations.

Delivery took place in a hospital during an influenza epidemic. On the third day after delivery the patient had a sore throat, headache, and chill, and suffered an attack of influenza.

On the seventh day the patient had a sudden rise of temperature to 104°, pulse 112, and a severe chill. For twenty days thereafter the patient had rapid rises of temperature to from 102° to 105° with a pulse of from 90° to 120°. There were frequent chills and sweats. Between the rigors the patient looked well, and her appetite was good.

The total course of the temperature was twenty-seven days. Pelvic examination showed the uterus to be small, the lochia normal, and adnexa not palpable. There was, however, a small, sharply-defined, moderately-tender induration in the base of the left broad ligament. This very gradually disappeared as the patient recovered.

My diagnosis was thrombophlebitis of the left uterine vein.

CASE 3.—Mrs. E. G. G., aged twenty-seven, a primipara in rather poor health, was delivered of a sickly child, that died after three weeks.

Her pregnancy had been normal and free from any infection of the vagina or of the urinary tract.

Labor lasted twenty hours. Instruments were used and chloroform was given as an anesthetic. There was a deep bilateral laceration in the cervix and a moderate one in the perineum.

Delivery took place during an influenza epidemic and the patient suffered at least from a mild attack.

On the third day of her puerperium the patient developed a temperature of 103° with some slight tenderness in her left lower abdomen. This gradually subsided and she left the hospital on the sixteenth day with a slight temperature. During the third week her temperature ranged from 99° to 100°, but there were no local symptoms. At the beginning of her fourth week she suddenly developed a temperature of 103°, and a severe chill. The white blood count was 17,000. For eleven days she had sudden rises of temperature with slight chills. Between the rigors she was quite normal. The total duration of fever was 37 days. The uterus was large and subinvolved, and there was some bloody discharge. The adnexa were normal.

In the outer part of the broad ligament was a well-defined, slightly tender mass, palpable both by the abdominal and by the vaginal examination. This mass gradually disappeared after the temperature became normal.

My diagnosis in the case was thrombophlebitis of the right ovarian vein.

227 MICHIGAN STREET.

(For discussion, see page 524.)

## PSEUDOCHOLECYSTITIS\*

BY HAROLD D. MEEKER, M.D., F.A.C.S., NEW YORK, N. Y.

IN RECENT years a few observers have recorded instances of certain bands or adhesions found in the upper abdomen and isolated cases have been reported. The consensus of opinion has been that the etiology must be definitely established and the bands scientifically classified before they will merit serious consideration.

In a study of over four hundred laparotomies in which these bands were present, it was observed that certain types occurred with such a degree of constancy that the following arbitrary anatomic classification suggested itself:

- I. Bands Involving the Duodenum.
  - 1. Hepatoduodenal band.
  - 2. Cholecystoduodenal band.
  - 3. Hepatocystoduodenal band.
- II. Bands Involving the Stomach.
  - 1. Hepatogastric band.
  - 2. Cholecystogastric band.
  - 3. Hepatocystogastric band.
  - 4. Duodenogastric band.
- III. Bands Involving the Colon.
  - 1. Hepatocolic band.
  - 2. Cholecystocolic band.
  - 3. Hepatocystocolic band.
  - 4. Gastrocolic band.
- IV. Irregular.

Other combinations may exist but none have been reported by others or observed by the writer.

### ETIOLOGY

In the limited literature on this subject three theories have been advanced in an effort to explain the presence of these bands. One is that they are the remains of embryonal structures; another, that they are the result of evolutionary development; the third theory considers them the result of a toxic process. In the opinion of the writer all three factors may enter into their formation. In well nourished individuals with strictly localized symptoms, without signs of toxemia, and without any history of a previous inflammation or operation, the bands are believed to be of embryonal origin, the structure of which has gradually become altered so that a point is eventually reached when they interfere with the normal functioning of the involved organs. In these cases there is no apparent need for additional

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\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20-22, 1920.



supports of the involved organs, which would be the underlying factor of an evolutionary development. Neither is there any evidence of a previous inflammatory condition which has called forth a protective exudate, to become subsequently organized and involve approximated organs in a reparative process. The bands present in this group then are considered as of embryonal origin, for the reason that their presence does not appear to be explainable in any other way. An evolutionary origin is assumed for cases in which, in addition to the local symptoms, there is a pronounced toxemia associated with a visceroptosis, which always results in more or less interference with the mesenteric circulation with consequent nutritional disturbance and a general lowering of muscle tone. In other words the bands are developed as accessory ligaments in response to the demands of the prolonged downward drag for additional support. Any of the causes of a visceroptosis may thus be responsible for the subsequent development of the bands, which afford a practical demonstration of Nature's attempt to reenforce supporting structures in the line of strain. The irregular bands or adhesions are believed to be the result of a local toxic process or the denudation of peritoneal cells at some previous operation. There is no biomechanical rule, no developmental process by which this irregular fixation of adjacent tissues can be logically explained.

In this series of four hundred cases of bands found in the upper abdomen, the ones which occurred most frequently were those involving the gall bladder, 140, or 35 per cent, being of this type. In view of its relative frequency, this particular group of bands is herewith given detailed consideration.

The title pseudocholecystitis is self-suggestive, inasmuch as these cases almost invariably give rise to certain symptoms which we have been taught to interpret as indicating a cholecystitis. When operation, however, shows no evidence of a previous or present inflammatory process, it is obviously incorrect to classify the condition as cholecystitis. A true cholecystitis and bands involving the gall bladder may coexist, in which case the inflammatory symptoms will mask those caused by the bands.

#### AGE AND SEX

It was observed that the majority of these bands occurred in women between the ages of thirty-five and forty-five. The youngest case of the series was twenty years and the oldest sixty-five years.

#### OCCUPATION

Individuals who had undergone hardships in early life, improper or inadequate food, together with prolonged exertion; and those of sedentary habits with an overabundance of food, seemed predisposed to the development of this condition.

## HEREDITY

Four instances occurred in which more than one member of the same family was operated upon for similar conditions. Several patients stated that the parents, or other members of the family, had had similar symptoms. If the origin of the bands in a particular case be embryonal, inherited tendencies or characteristics may be a factor; if evolutionary or inflammatory, similar living conditions and habits may be responsible for the development of like bands in the same family.

## AVERAGE HISTORY OF TYPICAL CASE

In considering an average history of cases in which a pseudocholecystitis exists, two types should be kept in mind: those complicated by bands involving other viscera, and the uncomplicated cases. In this

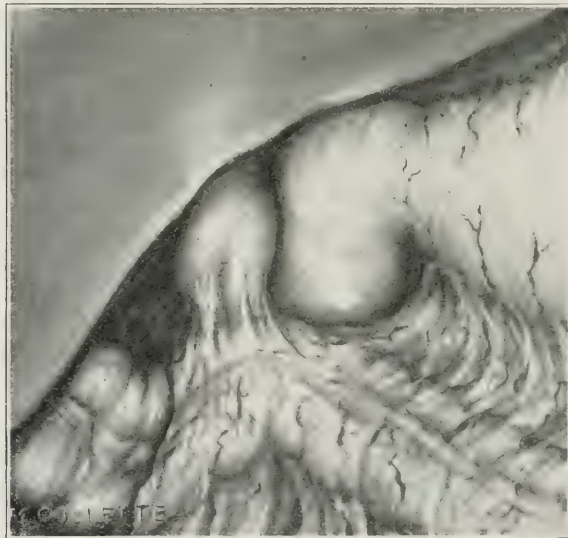


Fig. 1.—Cholecystocolic band showing downward drag on gall bladder, upward pull on colon causing angulation of gut when patient is in the upright position.

series 80 per cent were complicated by bands involving the terminal ileum, appendix or cecocolon; 10 per cent had either additional involvement of the small gut at the duodenojejunal angle, or of the pelvic colon, or both, or some other fixation band along the course of the gastrointestinal tract. It will be seen that in most cases where bands occur in the upper abdomen, adventitious structures will be found in other parts of the same cavity and should always be looked for.

In the average case of this group the symptoms are those of an intestinal toxemia of varying degree, in addition to local distress in the upper abdomen and, frequently, also at the site of involvement in some other part of the abdominal cavity. When the bands are sufficiently developed

to retard the fecal current, certain bacterial and chemical changes take place within the gut which are responsible for the resulting toxemia. These patients are apt to be poorly nourished, of sallow color and with dry and loose skin. They are always tired, in spite of a large amount of sleep. They are irritable, hypersensitive, and depressed. Obstinate constipation is the rule; but diarrhea, alternating with constipation and a chronic colitis, are frequently met with. Cold extremities, feeble heart sounds, and a low blood pressure are usually present. The local distress, in the instance of gall bladder involvement, is of slow onset, gradually getting worse. The discomfort is most marked after meals and is usually associated with gas in the stomach. An unusual amount of gas in the colon is apt to add to the epigastric discomfort because of the increased drag.



Fig. 2.—Hepatocystocolic band showing downward drag on gall bladder and liver, and fixation of colon.

Many patients have learned that the recumbent position diminishes discomfort and have acquired the habit of lying down for a time after meals. Some are never comfortable except when lying down; others may be relieved by posture but are never entirely free from discomfort. Jaundice may appear when the bands are so situated as to drag on the common duct and thus interfere with the flow of bile. This type of jaundice is remittent and disappears rapidly when a posture is maintained which relaxes the drag, but it promptly reappears when the upright position is resumed. Recurrent, so-called "bilious attacks" with vomiting, are common. Actual pain is rare; when, however, a band is attached well down on the gall bladder, toward or involving the ducts,



sharp pain simulating gallstone colic may occur. Tenderness may always be elicited by making traction on the fixed points of the band.

In the second or uncomplicated cases of pseudocholecystitis, the patients are well nourished, do not show indications of intestinal toxemia and complain only of such local distress in the upper abdomen as has just been cited. The diagnosis of the various types of bands which may cause a pseudocholecystitis, will be considered separately in order of their most frequent occurrence.

1. *Cholecystocolic Band*.—This type occurred in 47 per cent of the 140 cases. The upper limit of the band is usually attached to the fundus of the gall bladder but may extend to the base of the cystic duct. The lower end is attached to the upper border of the transverse

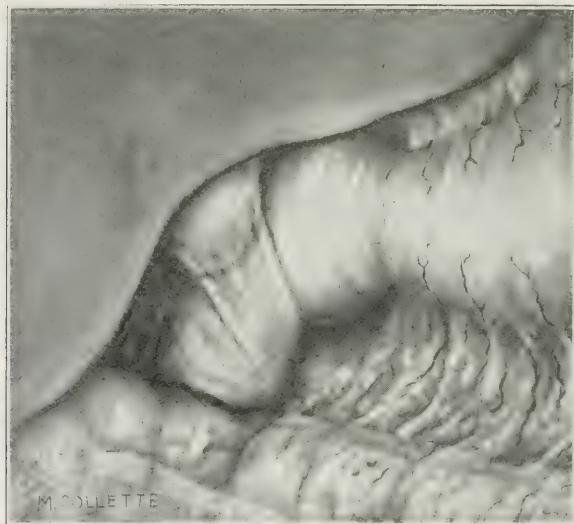


Fig. 3.—Cholecystoduodenal band showing drag on gall bladder and constriction of duodenum.

colon, with prolongations extending to the transverse mesocolon. These bands vary in density, most being rather delicate, fibrous, and do not bleed when divided. The usual subjective symptoms have been alluded to. In the physical examination, direct pressure over the gall bladder gives rise to slight tenderness, deep pressure over the transverse colon just below the gall bladder also gives rise to slight tenderness, but the moment the direct pressure at this point is changed to downward traction, pain is elicited not only under the finger tips but also at a point several inches above the examining fingers. This procedure may cause sharp pain in the back and shoulder. This type of band may cause a degree of duodenal constriction depending upon its structure and point of attachment to the colon.

In patients with an abdominal wall difficult to palpate, the position of the transverse colon may be well defined by passing a soft rubber

catheter into the rectum, attaching a Davidson syringe bulb to the catheter and inflating the bowel with air. The outline of the gut can occasionally be seen, frequently felt and always mapped out by percussion, by this method, and an abnormal fixed point readily determined.

A true cholecystitis may be eliminated by the absence of history or local signs of an inflammatory process.

In differentiating a pseudocholecystitis from gallstones, the following procedure is of value: Place the patient in moderate Trendelenburg posture, with knees flexed to help secure the maximum relaxation of the abdominal wall. If deep palpation over the gall bladder gives rise to pain or tenderness, which is increased by pressure upwards

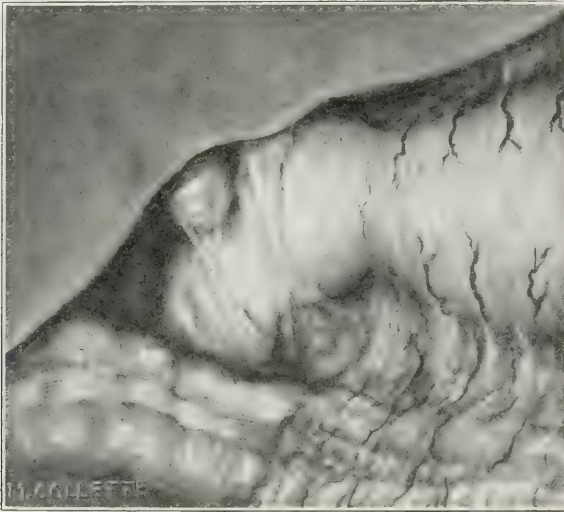


Fig. 4.—Hepatocystoduodenal band showing drag on gall bladder and liver, and constriction and fixation of duodenum.

under the liver, gallstones are probably present. If upward pressure relieves or does not increase the discomfort, and downward traction aggravates it, a cholecystocolic band probably exists. If pain is caused under the examining fingers by pressing the gall bladder up under the liver and pain is also caused by downward traction below the gall bladder but referred to a point above the finger-tips, as well as directly under them, gallstones and a cholecystocolic band probably coexist. An x-ray examination may show gastrointestinal motor insufficiency, duodenal constriction and an angulation of the transverse colon if the plate is made with the patient in the upright position. Such examination, however, is of no great value in determining the presence or absence of a cholecystocolic band. The strain produced by a band of this type is downward on the gall bladder and upward

on the transverse colon. Gall bladders have been observed extending from one to four and a half inches beyond the liver margin, as a result of the prolonged downward drag.

2. *Hepatocystocolic Band*.—This type was present in 18 per cent of the series. In most instances the attachment to the liver is close to the cystic fossa and consequently gives rise to signs and symptoms practically identical with those caused by a cholecystocolic band. It is of no material advantage to differentiate the two.

3. *Cholecystoduodenal Band*.—Sixteen per cent of the involved gall bladders showed bands of this type. This variety may cause duodenal constriction and more rarely a degree of rotation. The amount of resistance to the passage of the duodenal contents determines the degree

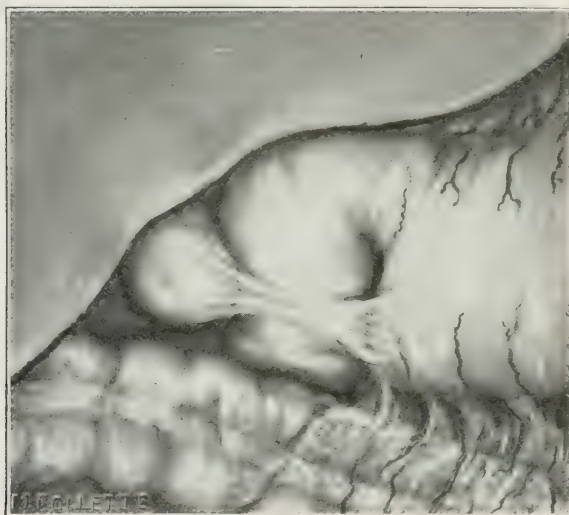


Fig. 5.—Cystogastric band. Gall bladder dragged downward and to left, pyloric end of stomach pulled to the right. Duodenum constricted.

of duodenal dilatation above the point of constriction as well as the gastric dilatation and delay. Patients with this type usually complain of chronic indigestion with marked fermentation. Frequently there is pain in the epigastrium which is relieved or ceases when the patient lies down. An acute inflammatory condition may be eliminated by the history. Tenderness over the gall bladder extending downward and to the left, sharply localized, increased by downward traction, but decreased by upward traction, when present with any or all of the aforementioned subjective symptoms, suggests the presence of this type of band. X-ray examination may show a duodenal dilatation above the band and irregularities in the involved gut which are frequently interpreted as indicating duodenal ulcers. The line of strain is downward and to the left on the gall bladder, and upward and to the right on the duodenum.



4. *Hepatocystoduodenal Band*.—Thirteen per cent of the series had this type of band. The signs and symptoms of the combined type do not differ materially from those of the cholecystoduodenal type and there is no material advantage in differentiating the two.

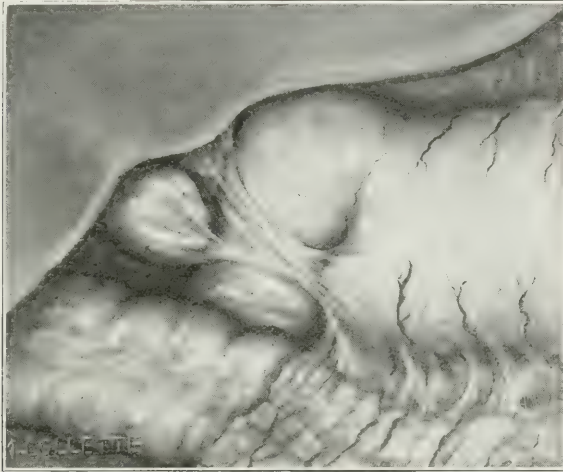


Fig. 6.—Hepatocystogastric band. Same as Fig. 5 with addition of liver drag.

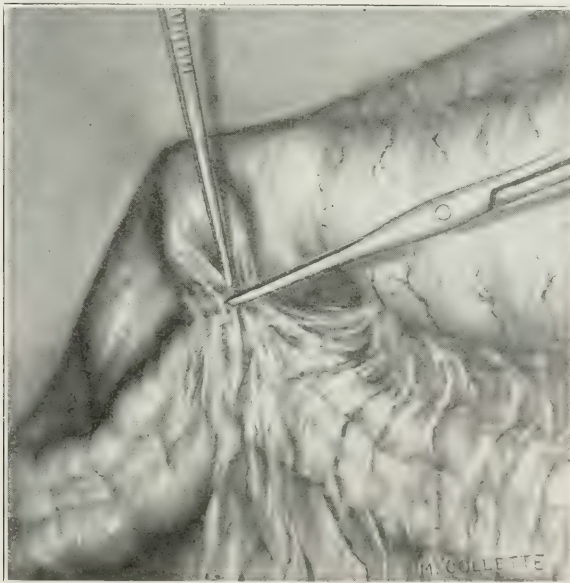


Fig. 7.—Technic of repair. Margin of band lifted from underlying structures and nicked with scissors preparatory to undermining of edges.

5. *The cystogastric band* was present in 3 per cent of the cases. These bands also vary in density. The most frequent point of gastric attachment is on the greater curvature, 4 to 5 cm. from the pylorus. Fibrous

prolongations are often seen attached to the gastrocolic omentum. The strain is downward and to the left on the gall bladder and upward and to the right on the stomach.

#### SYMPTOMS

There is tenderness at the points of attachment of the band, and there may be constriction of the duodenum between these two points. Patients complain of a varying amount of discomfort in the gall bladder region, gastric fermentation and pain, the severity of which may be influenced by the power of the gastric muscle contraction and the weight of the stomach contents. The discomfort is usually modified or relieved by the recumbent position.

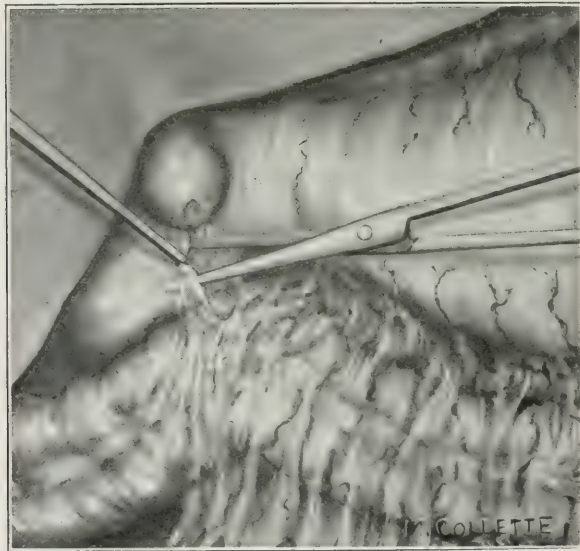


Fig. 8.—Showing method of blunt dissection. After the underlying loose tissues have been pushed aside the edges of band are further divided transversely until all tension and abnormal fixation has disappeared. Surrounding peritoneum is further undermined if necessary, to permit covering of raw surfaces without tension.

#### DIAGNOSIS

This type of gall bladder involvement may be distinguished from a true cholecystitis by an absence of inflammatory symptoms. Pressure and traction downward and to the left over the pyloric end of the stomach gives rise to pain in the region of the gall bladder as well as directly under the finger-tips. The gastric attachment of the band may be so placed as to cause a water-trap stomach, as seen in the accompanying illustration. These cases are very frequently diagnosticated as gastric ulcer solely on the persistent and sharply localized point of gastric tenderness. X-ray examination may show a duodenal dilatation above the band

and a delayed emptying time of the stomach. Any irregularity detected in the stomach at the site of attachment of the band, is often wrongly interpreted to indicate an ulcer or neoplasm.

6. *The Hepatocystogastric Band* was also found in 3 per cent of the cases. The line of strain in this type is downward and to the left on the liver and gall bladder and upward and to the right on the stomach. The physical signs, symptoms, and x-ray findings are practically identical with those of the cystogastric bands.

*Irregular bands* adhering to no definite type or combination of types are the result of a preceding inflammatory process, or due to peritoneal irritation at a previous operation.

The signs and symptoms of this group are inconstant, depending upon the structures involved and the degree of involvement. A history of a



Fig. 9.—Showing method of inserting stitches to cover raw surface and invert raw edges of divided band.

previous operation or of symptoms indicative of an antedating inflammation in the upper abdomen together with functional disorders of one or more viscera of this region, suggests the presence of the irregular bands or adhesions.

#### SURGICAL REPAIR

When these bands have developed sufficiently to interfere with normal function of the involved organs, conservative measures are unsatisfactory and operation offers the only permanent relief. The surgical repair consists in the division of abnormal attachments which interfere with normal physiologic processes and the covering of all raw surfaces with peritoneum. This can usually be accomplished by dividing the bands transversely and suturing longitudinally with inversion of the raw edges.



In some instances, especially in the irregular types, omental grafts are used to insure proper covering of raw surfaces. Very fine round needles should be used, threaded with fine oiled linen or the finest catgut.

The technic employed in the surgical repair of an average cholecystocolic band is shown in the accompanying illustrations.

#### CONCLUSIONS

1. The occurrence of adventitious bands in the upper abdomen has been established beyond question.
2. These bands give rise to definite symptoms.
3. The gall bladder is the viscus most frequently involved, the resulting symptoms simulate a cholecystitis.
4. Plastic surgery has given definite relief. As complete freedom from symptoms has been recorded ten years after operation, it is reasonable to suppose relief may be permanent.
5. It is illogical and unfair to patients to withhold a chance of relief because the origin of these bands may not yet have been definitely established.
6. The frequency with which adventitious bands in other parts of the abdomen coexist with those of the upper abdomen, emphasizes the importance of a thorough search of the entire gastrointestinal tract for abnormal bands and fixed points.
7. It is to be hoped that a comprehensive discussion of these bands will be found in the surgical text books of the near future. A knowledge of the condition will be the means of restoring to a life of comfort many individuals otherwise condemned to continued suffering.

47 EAST FIFTY-SEVENTH STREET.

(For discussion, see page 519.)

## BENIGN MAMMARY TUMORS AND INTESTINAL TOXEMIA\*

BY WILLIAM SEAMAN BAINBRIDGE, M.C., U. S. N. R. F., NEW YORK, N. Y.

THE present paper purposes to record a series of twenty-five cases of abnormal mammary changes apparently caused by autointoxication. When these cases are seen in their early stages the breast condition is often overlooked; when they have developed into a more easily recognized state, frequently a diagnosis of malignant disease is made.

Each of the cases reported herein suffered from a coexistent chronic intestinal toxemia, and the amount of poisoning was reflected, in many instances, in the degree of change in the mammary tissue. When the autointoxication was relieved the breasts either markedly improved or returned entirely to the normal.

These cases classify themselves, more or less, into three groups. 1. Those with a condensation or lobular induration of the upper, outer quadrants of the breasts, usually along the edge of the large pectoral muscle, and where the dependent breast drags on the upper axillary margin. This occurs in both mammae, but more frequently in the left. Such terms as "toxic breasts," "lumpy breasts" or "stasis lumps" are descriptive of this condition. 2. Those cases that have, in addition to the above, and in the same region, localized degeneration with adenomata or cystomata. 3. Those that have an abnormal discharge from the nipple in conjunction with one or the other of the above conditions.

The diminishing of the gastrointestinal fermentation by diet, digestives, intestinal antiseptics, high alkaline colonic irrigations, and certain physiotherapeutic measures, is of distinct value. The use of these agents, together with a support to the breasts and a proper uplifting abdominal corset, often result in a complete disappearance of the breast lumps or tumors. However, some of the cases require surgical intervention of the underlying abdominal condition before the toxic poisoning is sufficiently relieved as to noticeably benefit the breasts.

In those cases where there is a cyst or adenoma in addition to a general lobular condition of the breasts, the removal of the growth and the correction of the intestinal stasis, by medical or surgical means, often result in the mammae becoming completely normal. A preliminary lessening of the general toxic condition, in some cases, materially helped in locating the real existing benign neoplasm, and hence it was made possible to save a considerable amount of curable breast tissue. By this means the patients were saved the mental and physical shock of an unnecessary amputation.

\*Read at the Thirty-third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20-22, 1920.

The majority of the following cases had marked chronic intestinal toxemia without any apparent accompanying pelvic disorder; a few had, in addition, complicating pathology: Five cases were cured without operation. Fifteen cases were cured by surgical relief of the chronic intestinal stasis, without operative interference of the mammae. One case was cured by the removal of an adenoma from a generally lumpy breast, with an abdominal section for the underlying intestinal pathology. Three cases were cured by the removal of an adenoma or cystoma from a toxic breast, and by the preliminary and the after treatment for the intestinal toxemia. One case is that of toxic breasts which had been removed; the underlying condition not having been recognized.

CASE 1.—I. I.; age thirty-five; female; single. First seen May 12, 1919. Constipation with usual symptoms of intestinal stasis; backache. On examination, found floating right kidney; general enteroptosis; mass of feces in lower colon; considerable gas in ascending and transverse colon; marked lumpy condition in upper, outer quadrant left breast. Prescribed tonic, laxatives, uplifting corset belt; special abdominal exercises, and general hygienic regime. June, 1920: Patient in excellent health; constipation relieved; no longer any lumps in breast. September 1920, passed examination to enter training school for nurses of large metropolitan hospital.

CASE 2.—E. S.; age thirty-three; female; single. First seen September, 1898. Marked constipation; frequent attacks of intestinal gas; distinct lumps in upper, outer quadrant of left breast; nipple normal. Very much worried about cancer. Prescribed diet, cathartics, and support to breasts, with very careful and frequent examination. Six months after treatment was begun lumps in breasts disappeared. For some years, patient noticed that if she became constipated and had "indigestion," there was a return of the lumpy condition. This was relieved by thorough catharsis. August, 1920: Breasts perfectly normal.

CASE 3.—J. L.; age thirty; female; single. First seen January, 1919. Subacute attack of rheumatic fever; feet extremely swollen; painful; intestinal indigestion; headaches; nausea; marked constipation. On examination found intestinal stasis; large lumps in both breasts; enlarged glands of neck; swelling of feet and ankles. Prescribed diet; high alkaline colonic irrigations; salicylates, for a short time, cathartics, with physiotherapy as able to take it. September 1920: Under treatment, swelling and pain in joints of feet and elsewhere gradually disappeared. Lumps in breasts entirely gone after two months. Twice she allowed herself to become constipated and to be indiscreet with diet and at both times noticed a soreness and distinct lumpy condition of breasts, which disappeared upon resorting to careful treatment.

CASE 4.—W. R.; age twenty-eight; female; married. First seen November 27, 1906. Rectal abscess and cyst of perineum removed. In 1919 complained of intestinal gas; loss of weight; constipation; soreness of breasts, worried about cancer. On examination, found gastropptosis; ascending colon and hepatic flexure clogged with fecal matter; considerable gas; distinct lumpy condition throughout breasts, more marked in upper, outer quadrant. Prescribed abdominal and breast supports; laxatives; high alkaline colonic irrigations several times a week; diet; tonic; special exercise. June, 1920: Patient stated she was no longer a "nervous wreck"; when careful of diet and bowels there is no soreness in breasts. Considers herself well. August, 1920: Excellent condition; breasts normal.

CASE 5.—A. G.; age forty-eight years; female; married. First seen December 9, 1918. Complained of pain and discomfort in left breast. On examination, found



breasts very large, dependent, and the inner quadrant of left one slightly lobulated; no real tumor formation. Prescribed breast support; laxatives, with usual hygienic regime and careful watching. June, 1920: Lumpy condition of breasts entirely relieved—still a little soreness; constipation improved.

CASE 6.—A. B.\*; age twenty-five; female; widow. First seen February 23, 1916. March, 1915, severe pain right iliac fossa; morphine prescribed; several recurrences; constipation. Since August, 1915, constant bloody discharge from left breast; later distinct lump developed. Radical amputation advised by several surgeons. Diagnosis of cancer made by several of them. On examination, found distinct tenderness right iliac fossa; abdominal gas; lumpy condition in upper quadrant of left breast; on deep pressure, nipple exuded bloody serum. Advised surgical interference for abdominal condition and that breast be kept under careful surveillance. Operation, March 11, 1916: Large, pendulous cecum; dilated terminal ileum; incompetent ileocecal valve; many abdominal bands and adhesions. Conditions corrected. (See Fig. 1.) August, 1920: Excellent general condition; breasts normal; no discharge

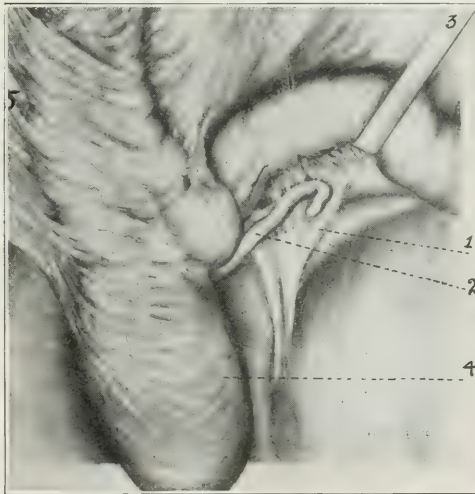


Fig. 1.—1. Ileopelvic band. 2. Kinked appendix attached to ileopelvic band. 3. Blunt retractor holding ileum upward. 4. Pendulous cecum. 5. Pericolic bands, so-called "Jackson membrane."

since sixth day after operation. One month previous to my examination she saw a physician in the South who pronounced her "100 per cent perfect."

CASE 7.—C. H.†; age forty-one; female; married. First seen May 27, 1914. For a year enlarged right breast with constant pain; amputation advised by several surgeons. For many years attacks of pain in regions of stomach and appendix. On examination, found dependent, lumpy breasts; nipples not retracted; pain over epigastrium on pressure; chronic appendix; intestinal stasis. Advised surgeon who referred patient for an opinion, to operate upon abdomen and to keep breasts under observation. Abdominal operation performed and diagnosis confirmed. No breast operation. June, 1920: Report by surgeon—patient's general health good; breasts normal.

CASE 8.—C. C.‡; age twenty-two; female; single. First seen March 1, 1913. Marked neurasthenia; constant nausea; vomiting and dizziness. No satisfactory im-

\*Case reported in part, in *Woman's Med. Jour.*, May, 1917.

†Case reported in part in: *Conservation of Human Breast*, *Internat. Jour. Surg.*, July, 1915.

‡Case reported in part: *Am. Jour. Obst. and Dis. Women and Children*, February, 1917.

provement after nine months medical treatment under care of gastrointestinal specialists. On examination found enlarged stomach; visceroptosis; mobile cecum; distinct chain of lumps extending down axillary line into substance of breasts. Operation, March 12, 1913: Marked enteroptosis; drag on duodenum by bands to transverse colon; mobile cecum, acting as bucket to retain fecal matter, dragging on posterior wall of abdomen, pulling over peritoneum and hanging into true pelvis; many abdominal bands and adhesions. Conditions corrected so far as possible. (See Fig 2.)



Fig. 2.—*r*. Ileal obstruction by bands. 2. Adherent and kinked appendix. 3. Mobile cecum. 4. Thickened portion of mesocolon along line of mechanical stress.

Advised abdominal support and light brassiere for a time, with careful observation of breasts. July, 1920: Breasts perfectly normal; no nausea or vomiting; excellent physical and mental condition.

CASE 9.—G. W.; age thirty; female; married. First seen January 25, 1917. For many years acute attacks of "indigestion" with pain in left side; vomiting; fever; headaches; abdominal gas; loss of weight. On examination, found lumpy condition in upper, outer quadrants both breasts; chronic intestinal stasis. Operation, February 12, 1917: Great omentum adherent to right lateral wall of abdomen; two bands



Fig. 3.—*r*. Stomach. 2. Dilated first portion duodenum. 3. Gall bladder held up by rubber covered forceps. 4. Liver. 5. Bands across duodenum from gastrocolic omentum to liver.

across duodenum, one to pylorus and other to transverse colon; band of adhesions twisting junction of small and large bowel; rotating and mobile cecum with diverticulum; tense band from posterior wall of abdomen attached to bowel, causing point



Fig. 4.—1. Cecal diverticulum. 2. Rotated, mobile cecum. 3. Ileum.

of obstruction. Conditions corrected. (See Figs. 3 and 4.) July, 1920: Patient in excellent condition; pain, indigestion, vomiting, etc., relieved; breasts normal; lumps entirely disappeared.

CASE 10.—H. K.\*; age twenty-five; female; single. First seen April 10, 1916. In 1914 had appendix removed; lost twenty-three pounds since then; troubled with gas; nausea; vomiting; abdominal discomfort; "at times kidneys do not work for a whole day." On examination found diffuse psoriasis of extremities and body; abdominal gas; dilated and prolapsed cecum; tenderness over terminal ileum; lumpy breasts. Operation, April 14, 1916: Adhesions from apex to base of gall bladder, indenting duodenum; extending towards stomach; band from transverse colon, almost causing obstruction of duodenum; duodenojejunal kink; dilated duodenum; band across ascending colon causing partial obstruction; mobile and dilated cecum. Operative conditions corrected. (See Figs. 5, 6, 7.) July, 1920: Patient reported

\*Case reported in part, in Medical Record, and Medical Press and Circular, London, April, 1920.

Previously, I have reported cases of like nature, where the clinical symptoms simulated attacks of gallstones or acute inflammation of the gall bladder. Release of the band as shown in above drawing completely relieved symptoms. It is gratifying to observe that since I have applied "pseudocholelithiasis" and "pseudocholecystitis" as entities, others have been employing the same terms.



by letter from Coblenz, Germany. Physical condition most satisfactory; lumps in breasts entirely gone; psoriasis improved, but persists.

CASE 11.—J. M.; age forty-two; female; married. First seen October 5, 1917. Pain in back and right, lower abdominal quadrant; tenderness in epigastrium; usual symptoms of intestinal toxemia with constipation. On examination found uterine

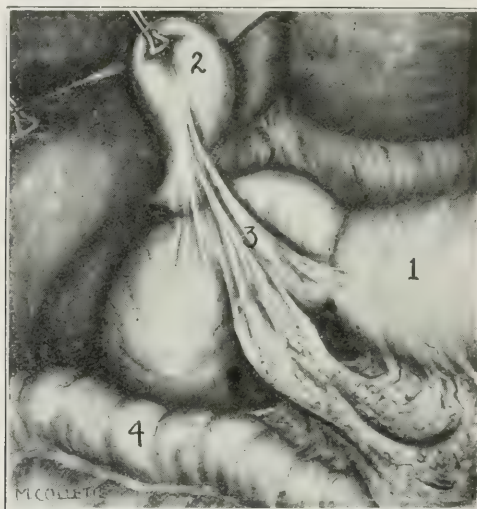


Fig. 5.—1. Stomach. 2. Gall bladder elevated by forceps. 3. Exposed band from base of gall bladder, across to and indenting duodenum, and attached to transverse colon below. Traction on transverse colon caused kinking and twisting of ducts, resulting in retention of bile in gall bladder. 4. Transverse colon.

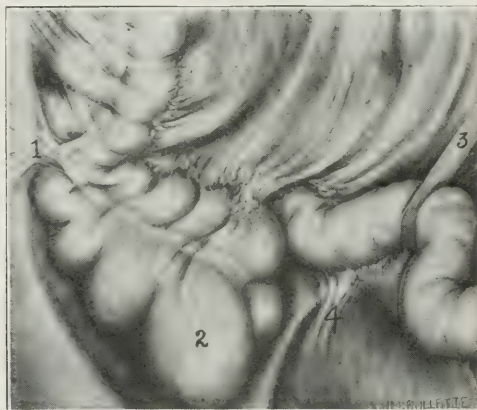


Fig. 6.—1. Band across ascending colon causing partial obstruction. 2. Mobile, dilated cecum. 3. Blunt retractor holding up dilated ileum. 4. Early stages of development of an ileopelvic band.

polyp; cystocele; perineal laceration; chronic appendix; ileal stasis; marked lumpy condition upper, outer quadrant left breast. Operation, October 11, 1917: Chronically inflamed and kinked appendix; adhesions around great omentum and gall bladder. Pelvic and abdominal conditions corrected. July, 1920: Excellent physical condition; constipation much improved and easily controlled by mild laxatives; no longer any lumps in breast.

CASE 12.—Van B.; age twenty-six; female; married. First seen August 18, 1919. For many years "stomach trouble with bilious colic"; attacks of pain right upper quadrant of abdomen, extending to back; recently more marked and more frequent. On examination found dilated gall bladder; chronic intestinal stasis; lumps in upper, outer quadrants both breasts. Operation, September 19, 1919: Adhesions and bands

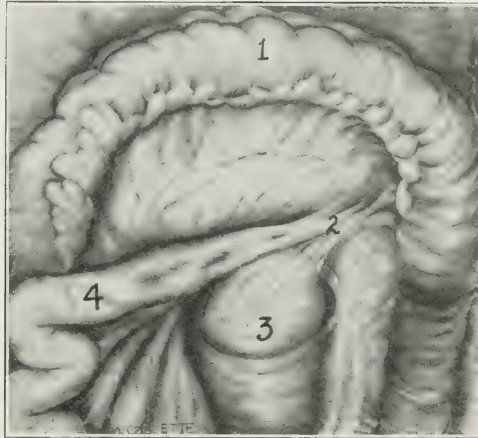


Fig. 7.—1. Transverse colon held up, exposing under surface of transverse mesocolon. 2. Duodenojejunal kink. 3. Dilated duodenum. 4. Jejunum.

right upper quadrant corrected; inflamed and thickened gall bladder with stones in cystic duct removed. Patient's condition was such it was deemed inadvisable to attack right lower quadrant. Prescribed uplifting corset; diet; cathartics. July, 1920: Patient free from attacks of abdominal pain; stasis symptoms relieved; breasts normal; lumpy condition disappeared; gain of weight; general condition greatly improved.

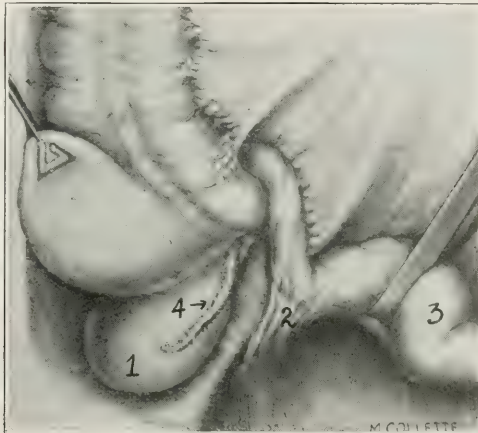


Fig. 8.—1. Retrocecal pouch. 2. Ileopelvic band. 3. Dilated ileum held up by blunt retractor. 4. Adherent appendix.

CASE 13.—M. G.; female; single. First seen March 2, 1916. Typical symptoms of chronic intestinal stasis. On examination, found patient anemic; abdominal gas; enteroptosis; intestinal stasis; enlarged and retroverted uterus; tenderness over left

ovarian region; breasts lumpy at outer quadrants. Operation, March 10, 1916: Band from transverse colon to gall bladder; enlarged cecum with retrocecal pouch; appendix adherent to wall of diverticulum; last loop of colon fixed in abnormal position by bands; retroverted uterus. Conditions corrected. (See Fig. 8.) August, 1920: Excellent physical condition; breasts normal.

CASE 14.—H. S.; age thirty; female; single. First seen November 12, 1915. Patient stated she had stomach trouble twelve years; frequent vomiting; lump in pit of stomach; constipation; headaches. On examination found distinct lumpy condition in upper, outer quadrant right breast; resistance over epigastrium; head of colon tender; marked abdominal gas. Operation, February 25, 1916: Strong band from transverse colon to gall bladder; constriction at duodenojejunal angle caused by band; ileopelvic band with appendiceal tie; dilatation ascending colon; dilatation and rotation of cecum. Conditions corrected. July, 1920: Markedly improved; breasts free of lumpy condition; normal.

CASE 15.—L. S.; age thirty-seven; female; single. First seen May 6, 1907. Complained of hardening and lumpiness of right breast. Advice given as to support of breasts and constipation. In 1916 returned for treatment complaining of discharge of milky serum from both nipples; many lumps throughout breasts; marked leucorrhea and excessive bleeding at periods. On examination found breasts very lumpy with a number of seeming cysts in both mammae. Large fibroid mass in uterus. Operation, December 27, 1916: Panhysterectomy for multiple fibroids; appendectomy; large, sacculated cecum plicated. Milky secretion in both breasts removed. No breast operation. May, 1920: Patient in good condition; no mammary discharge; breasts normal.

CASE 16.—C. H.; age thirty; female; single. First seen June 16, 1915. Beginning epileptic seizures nine years ago continuing off and on since; more frequent at present time; dizziness; dysmenorrhea. On examination found terminal ileum tender; upper quadrant of left breast lumpy; uterus congested and retroverted. Operation, July 1, 1915: Appendix removed; uterus stitched forward. July, 1920: Excellent condition; no epileptic seizures last four years; lumpy condition of breasts entirely relieved. Embraced Christian Science some months after operation and gives full credit to this form of treatment.

CASE 17.—A. S.; age thirty-two; female; single. First seen July 30, 1919. Six years ago developed severe backaches; palpitation; gas; abdominal pain; marked constipation and lumps in breasts. Operation, August 2, 1919: Abdominal and pelvic adhesions; right ovary fibroid and cystic; adherent appendix; stasis. Conditions corrected. (Note: Had previous laparotomy in 1917.) August, 1920: Twenty-seven pounds gain in weight; marked improvement in physical condition; constipation practically corrected; no longer any lumps in breasts.

CASE 18.—H.C.; age forty-three; female; married. First seen January 10, 1917. In 1905 had operation for acute appendicitis with abscess; since then troubled with gas, headaches; constipation. October 1916, sudden attack of indigestion; pain through back; severe vomiting. On examination, found tenderness over gall bladder; slightly enlarged liver; intestinal stasis; breasts somewhat lumpy. Operation, February 14, 1917: Great omentum thickened and tightly adherent to old wound; cecum rotated and anchored into right side; terminal ileum tightly adherent to posterior abdominal wall; gall bladder fastened to duodenum by bands; fifty-two gallstones; many abdominal bands. Operative conditions corrected as far as possible. August, 1920: Bowels regular; excellent physical condition; no lumps in breasts.

CASE 19.—W. L.; age thirty-four; married; female. First seen November 3, 1909. Complained of pain in abdomen; gas; constipation; nervousness. These symptoms fol-



lowed operation in 1905, for appendicitis. On examination found large tumor of uterus; movable right kidney; dilated stomach; lumpy condition of breasts. Operation, April 16, 1913. Cecum distended; adherent to right parietal wall, to transverse colon and to peritoneum of right iliac fossa; cystic right ovary; fibroid tumor of uterus; abdominal adhesions. Operative conditions corrected; uterine tumor excised. (See Fig. 9.) August, 1920: General condition good. Lumpy condition of breasts entirely gone.



Fig. 9.—1. Ileopelvic band. 2. Mobile, displaced and twisted ascending colon. 3. Bands kinking and attaching cecum to colon. 4. Dilated cecum. 5. Portion of appendix left after appendectomy—(1905).

CASE 20.—M. D.; age twenty-six; female; single. First seen November 30, 1915. Troubled with pain in right side; abdominal gas; nausea; marked constipation. Appendix previously removed. On examination, found full, baggy abdomen; large mass in cecal region; lumpy condition in upper, outer quadrant of breasts. Operation, November 30, 1915. Mobile cecum; ileopelvic bands; ileal stasis; transverse colon adherent to ascending colon; band in sigmoid with ovary attached. Conditions corrected. July, 1920: Very well except for dysmenorrhea and at times slight constipation. Breasts normal.

CASE 21.—G. U.; age 28; female; single. First seen April 3, 1915. Usual symptoms of intestinal toxemia; lump in right breast with pain. On examination, found distinct movable tumor, in the inner lower quadrant of right breast, with general lumpy condition of both breasts. Sent to me as cancer of the mamma. Advised early removal of definite tumor, and usual antitoxic treatment. Consented to operation February 9, 1917, and two fibroadenomata were removed from right breast. General treatment was continued as condition of patient was poor. At later operations removed tonsils and adenoids, and diseased right ovary with cystic tube, chronically diseased appendix and a twenty-pound fibroid tumor. April, 1920: Patient in excellent health; lumpy condition of breasts entirely disappeared.

CASE 22.—C. B.\*; age thirty-seven; female; married. First seen February 26, 1914. In November, 1912, noticed small lump right breast; left breast sore; constipation; symptoms of intestinal toxemia. Lump in breast gradually enlarged; declared malignant by surgeon consulted. On examination, found diffuse lumpy condition both breasts; indefinite mass lower, outer quadrant right breast; nipples not retracted.

\*Case reported in part in "The Cancer Problem," p. 202.

Prescribed usual regime for intestinal toxemia, and kept breasts under careful observation. March 21, 1914: Tumor mass stood out clearly, the surrounding induration having greatly diminished. Operated, removing fibroadenoma, which was proved by pathologic examination. July, 1920: Patient in good health; complete disappearance of lumpy condition of breasts.

CASE 23.—C. G.; age thirty-seven; female; married. First seen March, 1908. Both breasts distinctly lumpy with three cysts in right one; typical symptoms of intestinal toxemia. Cysts removed, and treatment instituted for constipation and toxemia; urged importance of frequent examination of breasts. Breasts returned to normal and patient remained well until June, 1920, when an acute attack of muscular rheumatism, preceded by a prolonged period of constipation, brought to her attention a few small lumps in left breast. Patient fearful of cancer. On examination, found right breast normal; slight lumpy condition in upper, outer quadrant of left breast; no glandular involvement. Reassured patient concerning cancer, and tonic, laxatives and uplifting corset prescribed. July, 1920: Bowels easily regulated with laxatives; both breasts normal; lumps entirely gone.

CASE 24.—E. F.; age thirty-nine; female; married. First seen November 24, 1916. Intestinal indigestion; constipation; gas; lumpy breasts; feared cancer. On examination found tenderness over pylorus; chronic intestinal stasis; lacerated cervix; general lumpy condition both breasts with distinct tumor mass upper, outer quadrant each breast. Operation, December 4, 1916. Divulsion and curettage; repair of cervix; cyst removed from right breast. Pathologic report indicated benign condition of cyst; therefore, it was decided not to remove an apparent tumor from left breast, but to keep patient under close observation and treat without surgical intervention. Prescribed usual treatment for intestinal toxemia with support for breasts. June, 1920: Breasts perfectly normal; no lumps; no pain; constipation relieved; intestinal condition markedly improved.

CASE 25.—I. S.; age twenty-nine; female; single. First seen March, 1920. Always troubled with constipation. In June, 1918, lump appeared in lower quadrant left breast; consulted two surgeons both of whom advised radical operation. September, 1918, discovered lump in right breast. December, 1918, both breasts removed, nipples left. Report of pathologist—No malignancy. Consulted me for painful condition of chest wall along line of scar; "feared return of cancer." On examination, found deforming scars; region of breasts negative; clear case of stasis. Prescribed tonic; laxatives; diet, etc. Reassured as to any cancerous condition. September, 1920: With the correction of constipation and reduction of acid-producing diet, patient very much relieved mentally and physically.

#### SUMMARY

1. There are definite abnormal changes in the breast tissue, as in the thyroid gland, from intestinal toxemia.
2. Treatment by medical and mechanical means, or surgical intervention for the cure of the intestinal stasis, often means complete return to the normal of the lumpy or toxic breasts.
3. At times it is necessary to remove a definite, localized tumor from the breast, in addition to the above, before the mammary tissue regains its normal texture.
4. Care must be taken that these abnormal changes are not overlooked

in their early stages; and not diagnosticated as cancer when well developed.

5. In this connection, an important question must be noted: Would an early recognition of a toxic breast and timely and efficient treatment of the underlying intestinal causes, tend to lessen the danger of malignant degeneration? If this is so, then we have here an important contributory factor in the etiology of cancer of the breast.

34 GRAMERCY PARK.

(For discussion, see page 528.)

### MISSED ABORTION\*

BY JENNINGS C. LITZENBERG, M.D., F.A.C.S., MINNEAPOLIS, MINN.

"MISSED abortion" has not received the consideration in this country that it deserves, being generally considered a rare and unimportant condition, while, as a matter of fact, it is of rather common occurrence and results in invalidism, sometimes of a very serious nature. That this subject is neglected in American medical literature is attested by the fact that of 139 references collected, only ten are American and three of these do not mention the term "missed abortion;" they describe the condition as a rarity and, evidently, have never heard of the term first applied by Matthews Duncan<sup>1</sup> who, undoubtedly, got his idea from Oldham, who in 1847 coined the term "missed labor."

#### TERMINOLOGY

"Missed labor" was defined as follows: "Protracted pregnancy is the condition of a woman who has passed 278 days and at least a fortnight more than this. If the child dies *in utero* there is not then a "protracted pregnancy;" the woman is in a state of "missed labor." This term has become established by usage since 1847, when Oldham<sup>2</sup> first used it. Duncan<sup>1</sup> in 1878, recognizing the similarity of the condition of a dead fetus *in utero* beyond full term and no labor, known as "missed labor," and the condition of a dead fetus before viability and no effort at expulsion, logically used the terms "missed abortion" and "missed miscarriage." The latter term has fallen into disuse and the term "missed abortion" is now applied to all cases of death of the fetus *in utero* before viability with no effort at expulsion within the usual time of an ordinary abortion.

This naturally brings up the query: When does a woman normally abort after the death of the fetus? Of course the question must be answered more or less arbitrarily. Rhodes<sup>3</sup> says: "The fetus is usually aborted a few days after death," which is, I think, ordinarily not

\*Read at the Thirty-third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.



true. Seitz<sup>4</sup> is nearer right when he puts it any time up to four or five weeks.

Inasmuch as constitutional symptoms of any moment are rare in the early stages and the pathologic conditions begin to manifest themselves about the eighth week, I am inclined to place the arbitrary limit of two months after the death of the fetus as the borderline between "abortion" and "missed abortion," which seems quite logical to me because the symptoms of a woman aborting before that time will not vary much from the symptoms of an ordinary abortion.

#### ETIOLOGY

Etiology must be considered from two standpoints: First; what are the causes of retention or why is the abortion missed? Second; What are the causes of the expulsion after the uterus has lain dormant so long, or why does the secondary abortion occur? At this time we are not discussing the causes of the death of the fetus, but why is it not expelled at the usual time after the demise of the fetus? Lack of irritability of the uterus, which was first suggested by Veit and von Graefe,<sup>26</sup> of course occurs to any one, but why is the uterus unresponsive to whatever irritation it is that causes it to expel a dead ovum?

Liebmann<sup>5</sup> attributes it to central lesions, but this will explain only the occasional case. Scharlaub says it is due to a thin musculature of the organ. Leopold<sup>9</sup> and Stanley Warren<sup>10</sup> claim that it is due to peritonitis, and Menzies,<sup>11</sup> Mueller,<sup>12</sup> Playfair,<sup>13</sup> and Beigel<sup>14</sup> that it is caused by cancer. Sanger<sup>15</sup> claims that fibroids reduce the irritability of the uterus, and that lactation and physical shock may do the same. None of the explanations are satisfactory; but it is easy to accept the theory of lack of irritability of the uterus in spite of the fact that there is little real proof to establish it. Mechanical interference like atresia and stenosis of the os and cervix, (Rissmann,<sup>16</sup> Arthur,<sup>17</sup> and E. Fraenkel<sup>19</sup>); cancer or fibroids of course are easily understandable causes, but aside from these no satisfactory explanation is as yet forthcoming. Why does the secondary abortion occur? Why should a uterus, which has been dormant for weeks and months, suddenly expel its contents, and often with contractions of the greatest violence? The foreign body theory of Orloff,<sup>20</sup> and Ivanoff,<sup>21</sup> is not sufficient, for the foreign body has been present all the time.

The theory of pressure on the internal os and paracervical ganglia is reasonable, because the pressure occurs later on account of the more gradual shrivelling of the ovum and the slower disappearance of the amniotic fluid. But the theory of Ernst Fraenkel,<sup>19</sup> that the returning menstrual function with its consequent congestion causes the bleeding and contractions, is more tenable because it seems to be more effective the longer the time that has elapsed since the death of the fetus and the more the congestion of pregnancy has subsided. (O. Schaeffer.<sup>23</sup>)

## INCIDENCE

Missed abortion undoubtedly occurs much more frequently than the reports in the literature indicate. I have records of thirteen cases, twelve of which I have seen personally, and one was reported in detail by a former student. I am sure that I saw several cases early in my career when ignorance of the possibility of the condition led me to miss the diagnosis; but as I look back upon them now, I feel sure they were cases of missed abortion. Thirteen cases in one limited experience would not argue very great rarity. Williams,<sup>24</sup> and DeLee,<sup>25</sup> both believe that it is commoner than usually supposed. Up to 1896 von Graefe<sup>26</sup> collected 70 cases. Ernst Fraenkel,<sup>19</sup> reported several of his own and collected others from the literature, bringing the total number of cases up to 105.

I have consulted 52 references, published since 1903, and have found 75 others which, on account of difficulties brought about by the war, I am unable to secure; so I cannot make a compilation of the number of cases, but from the number of articles it would seem that missed abortion is far from a rare occurrence.

The condition occurs usually in multiparæ. Nassauer asserts that it occurs exclusively in women who have borne children. But this is not true. Only four of my cases were multiparæ, and others have reported similar experiences.

## RECURRENCE

In this series Mrs. L. had missed abortions twice within two years, and Machenhauer,<sup>27</sup> also reports recurrence.

## MEDICOLEGAL SIGNIFICANCE

When a married woman, in the absence of her husband, expels a fetus corresponding to a development of shorter duration than the husband's absence, which is possible in the event of a missed abortion, unjust suspicion may be cast upon her. Duncan,<sup>1</sup> commenting on this point said: "You cannot say that a woman is pregnant, without misleading, if she is in the condition of missed abortion. Such unfortunate misapprehensions have happened, which shows the importance of counting the term of a woman's pregnancy not, up to the time the fetus was discharged, but back to the time when it died."

## TERMINATION

Ultimately the ovum is expelled; but it may be retained for months and even years. One case of retention for twenty-eight years, and another for fifty-two years, found at autopsy, have been reported. The most common termination is maceration with toxemia. Mummification sometimes occurs and, exceptionally, the ovum may be infiltrated with calcium salts and an intrauterine lithopedion is the result. Infection

is not a common termination, contrary to experience in ordinary abortions; but if instruments have been used, or the membranes otherwise ruptured, as by frequent coitus, infection may result. Decomposition is common but putrefaction rare. The unrecognized missed abortion is sometimes brought to light by the appearance of an inexplicable sepsis months after the death of the fetus.

Polano,<sup>28</sup> and Ludwig Fraenkel, assert the possibility of complete resorption of the entire ovum. I have seen the entire disappearance of the embryo in an otherwise intact ovum. Absorption cannot take place after the tenth or twelfth week (Edgar). Skeletization is a very interesting termination in which the bones of the fetus with none, or very little of the soft parts attached, are found within the uterus. Rosenkranz,<sup>22</sup> reports a case in which he found the bones only of a four months' fetus.

#### PATHOLOGY

In my cases hemorrhage was a prominent finding, giving the ovum the appearance of a hematoma mole; but hemorrhage may be entirely absent. In the placenta infarcts are numerous, sometimes occupying nearly the whole organ, suggesting the probable cause of death of the fetus. Degeneration of various kinds and grades is the rule. Ohlbaum<sup>31</sup> found fatty degeneration of the entire ovum. The placental surface may be dry, shrivelled, tough, of a red or whitish yellow, or waxy appearance.

One of the great dangers of missed abortion is due to degeneration of the blood vessel walls which may be so completely destroyed that uncontrollable hemorrhage results. Rosenstein's<sup>32</sup> fatal case died of hemorrhage due to degeneration of the blood vessels and the neighboring uterine wall, which was transformed into a homogeneous mass.

The amount of amniotic fluid present depends on the age of the ovum at death and the length of time it has been retained in the uterus. In one of my cases in which a four months' fetus was expelled after retention for more than a year there was no amniotic fluid; and in another ovum of two months, retained two and a half or three months, the amount of amniotic fluid was apparently normal. Disappearance or marked diminution of the amniotic fluid without rupture of the membranes is the rule. Occasionally a dropsical ovum is observed (Seitz<sup>4</sup>). In cases of retention for any considerable length of time a deposit of connective tissue is nearly always found which may be in an amount sufficient to be called sclerosis of the placenta (Garrigues,<sup>35</sup> Rosenstein<sup>34</sup>).

A very interesting fact is the frequently found discrepancy between the size of the placenta and the fetus, the former being often as large as the placenta of a fetus a month or more older than the one found; this is due to connective tissue increase, hemorrhages into the placenta



and that curious true growth of the placenta after the death of the fetus. When the fetus dies, especially in the early weeks, the chorion and decidua may go on growing because they are nourished by the maternal blood circulating in the intervillous spaces which may continue for a long time. La Verge<sup>6</sup> observed karyokinesis indicating cell multiplication rather than hypertrophy. The Langhans or inner layer of the villous epithelium, which is not in direct contact with maternal blood, is an early victim to coagulation necrosis; but the outer syncytial layer, bathed in maternal blood, is preserved much longer until thrombosis takes place, shutting off the blood supply to the intervillous spaces.

In the second half of pregnancy von Franque<sup>7</sup> asserts that this interesting phenomenon of continued growth after the death of the fetus does not occur. That the placenta lives and grows, at least in the early months, after the death of the fetus has been proved by Moll,<sup>29</sup> O. Schaeffer,<sup>23</sup> Physalix,<sup>30</sup> Giacomini,<sup>8</sup> von Franque,<sup>7</sup> and LaVerge.<sup>6</sup>

Microscopic studies show all stages of necrosis of tissue, placenta, decidua, amnion, blood vessels, the fetus and even uterine walls. If the ovum remain in the uterus for a long time, drying out or mummification occurs. Calcification with lithopedian formation is rare; but, if maceration occurs in place of the drying out, the soft parts may entirely disappear; there being found only remnants or nothing of the secundines, and only the skeleton of the fetus remains.

#### SYMPTOMS

Usually, but not always, after the death of the fetus there are signs of an abortion which subside, and the patient and her attendant think that a threatened abortion has been avoided or completed. Weeks or months later the physician is consulted because there is no increase in the size of the uterus or, on account of continued hemorrhage, or the cessation of fetal movements and other subjective signs of pregnancy. Examination shows that the uterus has not grown or has even decreased in size. The patient, not infrequently, has already noticed that the size of the womb is diminishing. The consistency of the uterus is not characteristic of that elastic softness peculiar to pregnancy, neither is it hard like a fibroid but rather between the two.

Regressive changes in the breasts also take place. The patient thinking an abortion has already occurred, or mistaking the occasional hemorrhages for irregular menstruation, seeks the advice of her physician because of her unaccountable invalidism, which has been progressive, and begins usually with malaise, anorexia, "dyspepsia," or headache. This is followed by loss of flesh, chilliness, or even chills, a foul taste in the mouth, and sometimes by a bearing-down weight "like a stone in the abdomen." All of these symptoms increase until she is, indeed, an invalid and her medical attendant finds her a victim of grave anemia

out of all proportion to the loss of blood, and an afternoon temperature. In some cases symptoms of mental derangement appear and, occasionally, there may be no symptoms whatever. Ohlbaum<sup>31</sup> reports a case of a woman who carried a three months' fetus for more than six months "without causing any physical disturbance." Case 2 of my series carried a one month fetus for three months with no untoward symptoms.

#### HEMORRHAGE

Hemorrhage is a very inconstant accompaniment of missed abortion, but in some form or another it usually complicates the condition, sometimes it constitutes a very great danger. However, in some cases, there are no signs of hemorrhage; not even microscopically in the pathologic specimens. When hemorrhage does occur, the first bleeding is like that of a threatened abortion; then it may become intermittent, days, weeks or even months may intervene, or there may be a more or less constant blood-stained discharge varying in amount from time to time. Upon examination, or other manipulation, or at the time of expulsion there may be no bleeding or a violent hemorrhage. Duncan<sup>1</sup> noted the loss of a quart of blood from the introduction of a tent. Rosenstein<sup>32</sup> had a fatal case of bleeding due to degeneration of the blood vessels. The bleeding at expulsion of the ovum or postpartum is sometimes so severe as to threaten the patient's health and life. This is not altogether due to the lack of tone of the uterus but to hyalin degeneration of the blood vessel walls and to infiltration with connective tissue cells rendering contraction impossible.

#### DIAGNOSIS

The diagnosis is more readily made than the cursory writer would have us believe. More mistakes are made on account of the failure to bear in mind the possibility of the existence of a missed abortion than from the difficulties of making the physical finding. That master teacher of our art, Matthews Duncan,<sup>1</sup> put it very forcibly when he said, "I do not know of any subject better than missed abortion for illustrating the value or necessity of extensive knowledge with a view to good diagnosis. *If you do not know of a thing you are quite sure not to suspect it; and if you do not suspect a thing you are almost certain not to find it.*" Unfortunately there seems to be a lack of knowledge on the part of a considerable percentage of the profession of the possibility of the existence of a missed abortion, therefore it is likely to be overlooked. It was this ignorance, first on my own part and later observed in others, and the woeful paucity of literature on the subject in the United States, that led me to select this subject for discussion.

The diagnosis is not particularly difficult if the possibility of missed abortion is kept in mind. This possibility should be strongly suspected if a woman has skipped one or two menstruations and then had symptoms of threatened abortion, which have subsided, and the size of the

uterus does not increase. The lack of growth of the uterus can be determined, even if there be no previous knowledge of the patient, by two examinations made a month apart, or by comparing the size of the uterus with the size it ought to be for the supposed period of gestation. If there be a lack of a combination of symptoms pointing to missed abortion, particularly if toxic symptoms are wanting, it may be wiser to wait even two months between the examinations. The uterus will not be as large as it should be, it will be harder, less elastic, and the other objective signs of pregnancy will be absent or regressing. The irregular bleeding may lead the woman to think she is not pregnant, particularly if her abdomen does not increase in size. The condition may then be mistaken for malignancy. Todd<sup>33</sup> reports a case where an eminent specialist diagnosticated a malignant growth and advised removal of the uterus at once. Any woman of the child-bearing age, who has suppression of the menses, irregular or atypical menstruation, toxic symptoms such as malaise, loss of appetite, chilliness, foul taste in the mouth, anorexia, loss of weight, particularly afternoon temperature, and who is in a general state of invalidism, should always have the possibility of missed abortion excluded before concluding that she has tuberculosis, syphilis, focal infection, or what not.

An instance which well illustrates how missed abortion may be overlooked is the following: Mrs. J., a multipara, skipped two menstruations, then bled irregularly for short periods; at first she thought she was pregnant, then she thought that she was not, interpreting her hemorrhages as irregular menses. She lost her ambition, had no appetite, was anemic and in a generally debilitated condition, and later she developed an afternoon temperature. Her husband, a physician, became worried about her condition and took her to a very good colleague for examination. He pronounced her not pregnant. He then had her examined by an excellent internist who examined her thoroughly, but could not account for the afternoon temperature. All sorts of tests were made, tuberculin, Wassermann, sinus illumination for focal infection, tonsil examination, and x-ray of the teeth, but her condition remained a puzzle. When we were called in, on account of quite a brisk hemorrhage, a diagnosis of missed abortion was made and when the uterus was emptied all the symptoms disappeared at once. Three excellent physicians had missed the diagnosis, not from lack of skill but from the lack of knowledge that "missed abortion" is always a possibility with skipped and irregular menstruation, and obscure invalidism, particularly with an afternoon temperature. Internists should note that missed abortion is a cause of afternoon fever.

#### PROGNOSIS

The prognosis in this condition is not as favorable as is generally supposed. While most cases, if left to themselves, will finally expel



the dead ovum, the dangers of its presence are real. A condition which constantly has the potential danger of hemorrhage, invalidism, which may become permanent, and death, cannot be considered lightly. Duncan's case<sup>1</sup> of excessive hemorrhage illustrates the danger from this source.

My case, No. 5, of prolonged invalidism with ultimate recovery, shows the low state of health to which a woman may descend, but yet be restored after emptying the uterus. Case 7 is an example of a woman in good health up to the time of her missed abortion resulting in an invalidism from which she never recovered, finally ending in tuberculosis. Rosenstein's fatal case of hemorrhage from degenerated blood vessels illustrates that missed abortion has a definite mortality.

#### TREATMENT

With this prognosis, expectant treatment cannot be safely prolonged. Rosinski<sup>34</sup> believes the uterus should be emptied immediately and Rosenstein<sup>32</sup> was driven to the same conclusion by his fatal case, going so far as to advise vaginal hysterectomy in cases of long standing. I am thoroughly convinced that missed abortion is a very much more serious condition than is generally supposed and that we are not justified in exposing our patients to the dangers of temporary or permanent ill health, or even death, by allowing missed abortion to go on indefinitely in the hope of a spontaneous termination.

If the ordinary methods of inducing expulsion fail, the cervix should be dilated, the contents removed, and the uterus packed, on account of the tendency to postoperative bleeding. The inexplicable indolence of the uterus, which has caused the retention of the dead ovum, seems to persist, rendering it incapable of contractions. Often the cervix inordinately resists dilatation; if difficulty is met in attempting to dilate the uterus, one should not persist in the attempt but perform a hysterotomy (vaginal Cesarean section) immediately.

#### CONCLUSIONS

1. Missed abortion is the prolonged retention of a dead fetus *in utero*.
2. It is a common condition.
3. The cause is unknown.
4. The dangers are: (a) Temporary ill health, continuing until the uterus is emptied. (b) Permanent ill health, if allowed to continue too long. (c) Death.
5. Its medicolegal significance is important.
6. Diagnosis made on regressing signs of pregnancy, irregular bleeding and afternoon temperature.
7. Afternoon temperature with any of the above signs is particularly significant.
8. Uterus should be emptied before condition becomes a menace to health.

## PERSONAL CASE REPORTS

The cases which I have personally observed I desire to present in abstract as follows:

CASE 1.—Mrs. J., para ii; month of fetal death, second; retention *in utero* after death of fetus, five months; symptoms, invalidism, anemia, hemorrhage. Diagnosis not made before expulsion.

CASE 2.—Mrs. X., para ?; month of fetal death, fourth; retention *in utero*, four months; patient not seen. Diagnosis made from specimen and history.

CASE 3.—Mrs. D., para i; month of fetal death, three and one-half; retention *in utero*, three; symptoms, general invalidism, no bleeding.

CASE 4.—Mrs. C., para i; month of fetal death, third; retention *in utero*, ten months. In this case the diagnosis was not made until the complete ovum was expelled at the end of the thirteenth month.

CASE 5.—Mrs. B., para iii; month of fetal death, first; retention *in utero*, three months. No symptoms.

CASE 6.—Mrs. C., para i; month of fetal death, fifth; retention *in utero*, two months. No symptoms.

CASE 7.—Mrs. T., para i; month of fetal death, fourth; retention *in utero*, three months. Course marked by weakness and afternoon temperature; afterwards developed tuberculosis, possibly favored by the debilitated condition.

CASE 8.—Mrs. L., para v; month of fetal death, fourth; retention *in utero*, three months. Course marked by general debility, loss of weight, anorexia, afternoon temperature. This patient had two "missed abortions" two years apart.

CASE 9.—Mrs. L., para vi; month of fetal death, third; retention *in utero*, four months. (Same as previous case.)

CASE 10.—Mrs. A., para ii; month of fetal death, third; retention *in utero*, four months. Course marked by irregular bleeding, loss of weight, general debility, afternoon temperature.

CASE 11.—Mrs. B., para iv; month of fetal death, second; retention *in utero*, four months. No symptoms.

CASE 12.—Mrs. J., para iii; month of fetal death, fourth; retention *in utero*, four months. Course marked by anorexia, loss of weight, anemia, marked debility.

CASE 13.—Mrs. S., para ii; month of fetal death, fifth; retention *in utero*, three months. Course marked by debility, no temperature.

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(For discussion, see page 522.)



## SPLENIC LEUCEMIA ASSOCIATED WITH PREGNANCY\*

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**L**EUCEMIA is defined by Delafield and Prudden<sup>1</sup> as a disease in which the characteristic changes are an alteration in the relative proportions of the different leucocytes of the blood with, usually, an increase in their number, and the appearance of certain forms not seen in the circulation under normal conditions. The red cells are diminished in number and abnormal in form. Accompanying these alterations in the circulating blood are changes in the bone-marrow, spleen and lymph nodes.

Leucemia is usually classified in four types which are determined by fairly well defined clinical and morphological characteristics. These four types are designed as acute and chronic lymphatic leucemia, and acute and chronic myelogenous or splenomedullary leucemia. The latter type we find, in very rare instances, associated with pregnancy; but whether any direct connection exists is still undetermined. Obstetric text books afford us very little satisfaction. Aside from the general statement that the disease occurs and is made worse during pregnancy, no further information is presented. Most authors regard it as a rare complication, and only a comparatively small number of cases have been described.

It is unnecessary in this paper to consider in detail the signs and symptoms of leucemia. The essential point in the diagnosis is the occurrence of a very great increase in the leucocytes, not at all uncommonly up to 200,000, or more. The large number of myelocytes, from 30 to 50 per cent of all the leucocytes present, serves to distinguish the splenomedullary from the lymphatic type of the disease. In the latter the striking feature is the enormous relative increase in the small lymphocytes, often from 90 to 95 per cent, the myelocytes, on the other hand, being very scanty.

The occurrence in the writer's experience within a comparatively short interval of time of two well developed and subsequently fatal cases of leucemia associated with pregnancy, has prompted the brief clinical study of the subject herewith presented. Before proceeding with the recital of cases, a review of the literature may be of interest. No satisfactory references to this subject antedate the year 1888, and since then scattered cases have been reported totalling only about twenty.

J. Whitridge Williams<sup>2</sup> comments on the rarity of leucemia as a

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complication of pregnancy and advocates termination of the latter in serious cases, as good results have been known to follow this course. He refers to the statistics of Hermann and Schroeder.

Edgar<sup>3</sup> states that women affected with leucemia seldom become pregnant and in the few recorded cases the infant was sound.

Other standard textbooks either fail to mention the complication or dismiss the subject in a similar fashion. An examination of the journal literature affords us good descriptions of several cases, but leaves no doubt of its rarity.

In an analysis of 60,000 labors occurring in the service of the New York Lying-in Hospital during a period of twenty years, from 1890 to 1910, J. W. Markoe<sup>4</sup> does not include a single case of leucemia complicating pregnancy and diagnosed as such.

A single case of Hodgkin's disease or pseudoleucemia occurring in this institution was published by A. B. Davis<sup>5</sup> in which the characteristic pathologic changes were present. The patient died about three months after delivery and autopsy confirmed the diagnosis. The blood examinations in this case showed the usual picture associated with this disease without any evidence of the characteristic leucocytosis associated with true leucemia.

Another case of interest in this connection is the report of a successful splenectomy by Dr. A. B. Davis<sup>6</sup> in which the enlarged and wandering spleen found, was probably due to a long standing malarial infection and no characteristic leucocytosis was present.

Of the undoubted cases of true leucemia complicating pregnancy, the first mentioned is that of Greene,<sup>7</sup> of which the original reference unfortunately has not been accessible. The reports which have been obtainable include the following cases arranged chronologically:

J. C. Cameron.<sup>8</sup> Patient aged thirty-six; para vii; seen in the seventh month of her pregnancy with a history of having been under treatment for leucemia for the previous year. A tumor had developed in the left hypochondrium during the sixth pregnancy. Children all normal. Patient had been losing flesh for three years, with occasional attacks of icterus. She was delivered spontaneously of a four and one-half pound child, which was apparently well, in good condition, but died on the fourth day. Autopsy on baby negative as to leucemia. Blood counts practically normal; no leucocytosis. Mother's blood showed the characteristic changes.

The point of interest in this case is the hereditary tendency as a possible factor in the disease. The grandmother and mother apparently had symptoms pointing to leucemia. Two of her children developed leucemia and all had attacks of jaundice at intervals. The most marked symptoms, namely edema and dyspnea, rapidly subsided after labor and the disease ran an apparently chronic course. In this case three recurrent pregnancies took place after the splenic enlargement was noted. Disastrous effects on the nursing child were noted; but the case seems to show that a leucemic mother can bear a nonleucemic child.

In a subsequent paper<sup>9</sup> the author presents a supplementary report on this case. The patient again became pregnant<sup>8</sup> with exacerbation of symptoms, including edema, dyspnea, loss of weight, and weakness. She went to term and had a rapid delivery, with slight bleeding, which was followed by early relief of symptoms. The child suffered from malnutrition and died during the fifth month. Convalescence of the mother was slow. Menstruation returned, but was painful and the dizziness and dyspnea remained. The patient again became pregnant<sup>9</sup> and was made much worse; so that labor was induced at the seventh month. The woman almost collapsed during the delivery of a dead and poorly nourished fetus. The recovery was very slow, and the spleen remained large. In this case the leucemia of the mother did not prevent a recurrence of pregnancy or limit its frequency.

W. W. Jaggard:<sup>10</sup> Patient thirty-four years of age, para vi. Regular menstrual history. Family and past history negative. Had five full-term, normal, and one premature, deliveries. Labors quick and easy. A rapidly growing tumor in left hypochondrium began eight weeks after the last labor and was accompanied by rapid loss in weight and marked malaise. Blood showed characteristic picture of the splenomedullary type of leucemia with a ratio of white to red cells as 1 to 2.7; hemoglobin about 50 per cent. Emaciation progressed rapidly, and was accompanied by severe abdominal pains and edema of the extremities. Death supervened eleven months after labor. No autopsy. The writer believes that the disease began during the sixth month of pregnancy at the time when the blood glandular organs are most affected by the influence of gestation.

Stillman (included in a report by Jaggard): Patient para iv, age thirty-four years; apparently went through one pregnancy with a healthy child and recovered, but died one month after the last confinement. A diagnosis of splenomedullary leucemia was made, but no further details of the case are presented.

Hilbert:<sup>11</sup> Patient age thirty-seven years; para viii; previously well. During the eighth month of her last pregnancy she suddenly developed severe headaches, general weakness with slight rise of temperature and, several weeks later, an extensive sloughing of the mucous membrane of the gums. Blood examination showed a leucemia. Characteristic petechial spots appeared. Spontaneous labor resulted in the birth of a macerated fetus. Very slight bleeding, followed by collapse and death in ten hours post partum. Autopsy showed a medullary leucemia with the spleen and lymph glands slightly enlarged. Cultures sterile. The author distinguished in this case a prodromal stage, lasting five weeks, followed by the true leucemic period which ended fatally. He thinks the gingivitis quite diagnostic.

C. E. Laubenburg:<sup>12</sup> Patient thirty-two years of age; very anemic; history of three previous miscarriages. Family history good. Menstrual history normal. Six living healthy children. A gradual decline in health during the previous six or seven years was noted, marked by weakness, malaise, cardiac distress, dyspnea, and edema of the extremities. This condition was usually worse during her pregnancies, but improved after labor. The three miscarriages were not accompanied by severe hemorrhages. A gradually increasing mass had been observed in the left side of the abdomen which, on admission to the hospital during her tenth pregnancy, extended downward to the fundus of the five months' uterus. Blood examination showed characteristic leucemia. A spontaneous labor occurred with the birth of a macerated five months' fetus. The patient went into coma during labor with marked dyspnea and rapidly progressing pulmonary edema, followed by death forty



hours after delivery. The diagnosis was confirmed by autopsy; the splenomedullary type of the disease being present. Extensive bacterial cultures were negative.

This case with those of Sanger, Cameron and Green are the only ones reported in which pregnancy occurred repeatedly in a woman already sick with leucemia.

H. Schroder:<sup>13</sup> Patient twenty-five years of age; always sickly. Had five labors and two miscarriages in a period of seven years. Labor spontaneous; one living child; others died at varying intervals from intercurrent diseases. No suspicion of blood disorder, although the patient noticed a splenic enlargement after her fifth labor. During the sixth pregnancy her previously noted symptoms of dyspnea, malaise, weakness, loss of weight, etc., grew worse and, when admitted to the hospital in the sixth month, blood examination showed the characteristic picture of splenic leucemia. Labor induced with delivery of a recently dead six months' fetus. No marked improvement followed. Autopsy on the child negative.

In this case the patient probably went through a full term pregnancy during the period in which her leucemia was already developed and after the second pregnancy, notwithstanding the induction of labor, no marked improvement resulted.

Hermann,<sup>14</sup> reported a case of leucemia at a meeting of the London Obstetrical Society and included in the paper were references to twelve cases published elsewhere. He found only eight cases sufficiently described from which to draw conclusions to the mutual influences of pregnancy and leucemia. Dr. Hermann concluded that the termination of pregnancy was indicated whenever the diagnosis of leucemia was made.

Melinkow and Zomakion<sup>15</sup> report 15 cases from the literature, including one personal case. This patient presented a leucocyte count of 220,000 and had been under treatment for a long time with the x-rays. Labor normal with slight atonic hemorrhage. During pregnancy the hemoglobin content sank from 65 to 45 per cent, red cells from 4,000,000 to 280,000. During the puerperium the hemoglobin sank to 21 per cent, red cells to 180,000. Microscopic examination of the placenta showed that the vessels of the fetal villi contained normal blood; that in the intervillous spaces were leucemic to a high degree, showing a complete anatomic separation between the two bloods. (Original not accessible, no details.)

Thaler:<sup>16</sup> Patient forty years of age; para ix; near term; developed an acute febrile angina followed by epistaxis and anemia. Labor with a dead fetus which, at autopsy, was found to have a hydrothorax, numerous ecchymoses, renal congestion, etc., but no evidence of leucemia. The mother's blood count at the time of labor showed 2,055,000 red cells, color index 0.87, 175,000 leucocytes. The author considers the disease in his case to have been due to the influence of an unknown toxin on predisposed abnormal blood-forming organs.

Peterson<sup>17</sup> reports the following well studied case which was fatal a few hours after labor. A primipara, age 24, gave a history of marked anemia extending over a period of seven years. She was admitted to the Breslau Maternity as the first case of leucemia in about 20,000 labor cases. At the time she was about seven and one-half months' pregnant, extremely anemic and with enlargement of both liver and spleen. The blood examinations seemed to contradict the diagnosis of leucemia based on other symptoms. The red cells, 1,800,000; no increase in the white cells noted; hemoglobin 25 per cent. Picture resembled that of a severe secondary anemia. A rapid spontaneous labor took place and a healthy vigorous child with normal placenta was delivered, the process lasting about eight hours. An hour and a half

later the woman went into sudden collapse without any response to treatment. Autopsy showed a marked anemia of all the internal organs with no lymph-node enlargement. Sections of liver, spleen and bone-marrow showed undoubted myelogenous leucemia in which the suddenly developing acute exacerbation during pregnancy in a predisposed person did not permit of sufficient time for the invasion of the circulation by the characteristic new cell forms.

#### PERSONAL CASES

CASE 1.—Mrs. A. L.; Italian; para iii; two children alive and well. Admitted to the Lying-in Hospital February 3, 1920, with a history of having last menstruated three months previously. Her physician had been taking care of her for the past month for a dyspnea which began about three months previously and was getting progressively worse. An edema of the legs had been coming on gradually, which was always worse in the evening. The patient complained of constipation. Examination on admission showed a well-nourished middle-aged woman, acutely ill, presenting a condition of moderate dyspnea, edema of the lower extremities, with no cyanosis, jaundice or rash. A marked odor of acetone in the breath was noticed. The tongue was coated; lips dry; lungs negative; heart slightly enlarged with the apex beat in the sixth interspace. Pulse 120. A faint systolic murmur at the apex was transmitted to the back. The abdomen was markedly distended so that no masses or areas of tenderness could be determined. No vaginal examination was made. During the night, after admission, the patient seemed in fair condition and apparently rational. Her general condition became worse towards morning. The pulse increased to 180, was of poor quality, and an examination of the chest at this time seemed to show a beginning pulmonary edema. No response to stimulating treatment noted. The patient began to vomit without apparent cause and then rapidly grew worse, dying at 10 A.M. February 4th, without regaining consciousness. The blood count showed a marked anemia and in addition a very high leucocyte count, 472,000; red cells, 1,090,000; hemoglobin 20 per cent; color index 0.2; polymorphs 5 per cent; small lymphocytes 88 per cent; large lymphocytes 9 per cent. Diagnosis of acute lymphatic leucemia was made. Urine examination negative. Abortion was indicated in this case and was to have been done the morning after admission, but the rapid progress of the symptoms terminated in a fatal issue before the uterus could be emptied. No clue was at hand of the patient's previous condition which, from the statement of her doctor, seemed to be quite normal. Her general appearance and good nutrition did not point to the presence of the disease for any considerable length of time.

The single blood count shows such a preponderance in the proportion of small lymphocytes, about 88 per cent with a total white cell count of 472,000, that one is inclined to regard this case as one of lymphatic leucemia, in contrast to the more commonly reported splenomedullary form. Unfortunately the rapidly progressing illness and failure to obtain an autopsy prevented a satisfactory diagnosis. No enlarged lymphatic glands were noted and the abdominal distention interfered with palpation of the spleen. It is possible that we had here an instance of the so-called mixed leucemia.

*Comment.*—This case demonstrates a rapidly progressing illness apparently coincident with the development of the pregnancy.

CASE 2.—Mrs. Lily D.; para iv; age thirty-five; Russian; admitted to the Lying-in Hospital, March 31, 1920. Patient gave a history of three normal deliveries, the last three and one-half years ago. The family history was negative in so far as could be ascertained. The patient had always been in good health; no definite history

of previous illness until after the birth of the last child. Since then she noticed a shortness of breath on slight exertion and was told she had heart trouble. Menstrual history apparently normal. Her last period began October 29, 1919. She stated that she felt sick soon after her pregnancy began, presenting a series of indefinite complaints, the most marked being dyspnea and weakness. She was referred to the hospital with a diagnosis of endocarditis, and the suggestion that the uterus be emptied.

Physical examination on admission showed a moderately well nourished woman with subcutaneous fat slightly developed; complexion rather pale and sallow; marked dyspnea present.

The heart showed a systolic murmur at the fourth interspace, transmitted to the left. An increased fremitus was noted over the apex of the right lung with harsh breathing over the left lung and signs of fluid at the base of the right lung. There was no edema or varicosities of the extremities. The abdomen was soft, thin-walled, and presented an area of moderate tenderness and swelling over the left hypochondrium extending downward. The globular, movable uterus reached about half way to the umbilicus. The blood examination, after admission, showed a marked anemia with greatly increased leucocyte count. A diagnosis of acute leucemia being made, probably of the splenomedullary type. The urine showed traces of albumen and a few granular casts. The patient's general condition seemed to grow rapidly worse after admission to the hospital. The dyspnea was marked, even when sitting up; the pulse was rather weak and irregular. The abdomen became considerably distended and slight elevations of temperature were present. Induction of abortion was done on April 4th, with a medium size Voorhees' bag, and a small living fetus of about five months' size delivered within a few hours. After labor the patient's condition grew worse. She was troubled with a continuous cough and expectorated abundant thick white mucus. The abdominal distention continued and did not respond satisfactorily to the usual treatment with irrigations, enemata, etc. Stimulation with digitalis and strychnia failed. The patient grew steadily weaker, was unable to take nourishment, became more cyanotic and, finally, sank into a condition of coma in which she died, April 18, about two weeks after delivery. Another blood count made April 7 showed a further diminution in the red cells and coloring matter with an increase in the leucocytes. The details of the blood and urine examinations follow:

*April 2.* Erythrocytes 3,350,000; hemoglobin 65 per cent; color index 0.9; leucocytes 106,000; polynuclears 8 per cent; small lymphocytes 11 per cent; large lymphocytes 81 per cent.

*April 7.* Erythrocytes 2,820,000; hemoglobin 55 per cent; leucocytes 120,000; color index 0.9; polynuclear 5 per cent; small lymphocytes 10 per cent; large lymphocytes 85 per cent.

*Urine Examination.*—Specific gravity 1.020-1.030; small amount of pus; trace of albumin; few granular casts; abundant urates.

*Comment.*—In addition to the blood condition, this patient presented undoubted evidences of cardiac and pulmonary disease; but the leucemia may be regarded as the terminal condition. The rapid progress of the illness during the pregnancy seems to point to a decided influence of this process on the blood dyscrasia. Nothing in the family or personal history, in so far as this could be obtained, was of note. Her other children were perfectly well. The premature fetus was alive at the time of delivery and normal. Wassermann was negative. No autopsy permitted.



## SUMMARY

A survey of the reported cases of leucemia complicating pregnancy in which a fairly definite diagnosis from the blood picture was made discloses a total of 12 cases, including two of the writer. The ages of the patients varied from twenty-four to forty; the majority being between thirty-two and thirty-six. With the exception of Peterson's case, all were multiparæ. A possible hereditary history is mentioned in only one case. The parity varied from three to nine. In most of the cases we get a history of living children that showed no tendency to the disease up to the time of the report but, in a few instances, we are told that the babies died at varying periods from a few days to five months, after labor. In four cases mention is made of the birth of macerated or stillborn fetuses. Among twelve cases the mother survived in but two, but how long these mothers lived is not stated, neither is the subsequent course of the disease given. In the majority of cases we find that the woman survived but a short time after labor. One of the writer's patients died before delivery took place. In Peterson's case death came on an hour after labor; in Hilbert's case death took place in ten hours, and Laubenburg's case death occurred forty hours after labor. There is a record of death in Stillman's case one month after delivery; my second case died in two weeks, and Jaggard's case died eleven months after delivery. In every instance but one (my own case) in which the definite diagnosis is presented, the splenomedullary type of the disease was observed. It will be noted that in many cases the authors mention a prodromal period in which progressive emaciation, anemia, and loss of strength were noted soon after pregnancy, from which no recovery resulted and during which period the woman again became pregnant. The leucemia itself does not therefore appear to be a deterrent factor to conception.

Although the presence of a true leucemia as a complication of pregnancy is from all available records a very rare condition, nevertheless we ought to be on our guard against it. Probably a considerable number of cases of marked anemia in which no satisfactory blood count has been made may have been true instances of this disease. In any case where an anemic patient fails to recover under proper treatment, a more minute and detailed examination of her blood should be made with reference to the possible diagnosis of leucemia. The occurrence of pregnancy in this disease indicates a most unfavorable outlook for the mother and conception must, therefore, not be allowed to take place where the condition is suspected. The prognosis is undoubtedly worse in the pregnant than in the nonpregnant state; and whether the association is accidental or not, is immaterial. Where the disease is already present abortion seems to be indicated, with a rapidly progressing course and a fatal issue. The presence of an enlarged spleen is an almost constant factor in the disease and should lead one to look

for this sign in every anemic patient. The value of the x-ray in leucemia has been brought forward; but, in the event of a pregnancy, its application as a cure for the disease may work an undoubted harm on the fetus and the induction of labor should be done before radiation is begun.

It is necessary to distinguish between the acute and chronic forms of leucemia. Pregnant women may contract a rapidly fatal leucemia if we are to believe the evidence of the cases thus far reported, although it seems possible that the disease was present in a milder form in many of these patients before their last and usually fatal pregnancy occurred. It will be noted that there are apparently cases of chronic leucemia in this series in which pregnancy and labor occurred, and for this reason conservative treatment has been advised under such circumstances. In view of the rapidly fatal ending during the puerperium it would appear that this advice is not justifiable and that in order to avoid such an outcome labor had better be induced in all cases.

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Owing to war interruptions, much of the recent Continental literature was not available for reference.

23 EAST NINETY-THIRD STREET.

(For discussion, see page 521.)

## OVARIAN DERMOID CYSTS: ETIOLOGY, DIAGNOSIS AND TREATMENT\*

BY BENJAMIN RUSH McCLELLAN, M.D., F.A.C.S., XENIA, O.

WHILE the term "dermoid cyst of the ovary" is not a scientific one, it has become so fixed in surgical and pathologic literature that it will require the dictum of a great leader in one or the other of these fields, to supplant it by a name more exact in its histopathologic description. Until in very recent years the origin of these strangely interesting neoplasms has remained in the domain of theory, and the controversies arising from their investigation and discussion were as interesting as ingenious. As recently as 1917, Graves expressed the opinion that "the dermoid does not develop from a true germ-cell or ovum, but from a blastomere which at an early time had been separated from the original germ-cell bundle," arguing that "the isolation of such a blastomere if transported away from its original location, accounts for the dermoid and teratoid tumors found in other parts of the body."

Probably the most illuminating contribution on the subject in recent years is that of Goodall of Montreal, who, in a very comprehensive report of his research in "Origin of Tumors of the Ovary" says: "Today there is but little doubt that the ovules by a system of parthenogenesis are responsible for the presence of dermoids and teratomata." Again, he tells us that "both these tumor types were really of only one kind, for they both contained products of the three fetal germinal layers, namely, the ectoblast, mesoblast and endoblast. The difference was one of the relative quantities of these and not of quality." Again, he quotes Lecaillon, who has done a great deal of work upon this subject, and who states: "We can consider as proved beyond all possibilities of doubt that parthenogenesis really takes place naturally in many mammals that are of widely differing species. Parthenogenesis is really evoked by this fact, and this fact alone, that the unfertilized ovum is endowed with the ability and property to evolve along the lines of embryonic development of segmentation and differentiation, and not because the egg has encountered special stimulus and special surroundings." He credits Loeb with the statement that parthenogenesis occurs in about 10 per cent of guinea pigs before they are six months old. Later the condition is much less frequent. Loeb describes one of these cases in the following words: "We see in each case a chorionic vesicle with trophoblast, plasmodia and syncytia penetrating into the neighboring tissue. There is also a structure present which is to be interpreted

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as a neural tube. As this type of growth occurs in the cortex of the ovary where follicles are normally seen, and are found within follicle-like cavities, they can be derived only from ova developing parthenogenetically. Fertilization can be excluded as the life history of some of these animals is known and precludes such interpretation. It is very probable that parthenogenetic change sets in soon after ovulation, the altered condition in the ovaries at that time supplying the necessary stimulus." Loeb further says, "The later stages of these developing embryos bear some resemblance to chorioepitheliomata and teratoid tumors." Goodall remarks that Loeb might have gone one step further and included dermoids, for histogenetically they are the same. "Nägel, Minot, and Ribbert have found wandering ova throughout the genital abdominal cavity." "Grant such wandering of ova," says Pfannenstiel, "then the propagation of derivative tumors allows a very ready and easy explanation."

Having established the fact that all three germinal layers contribute to the growth of these tumors, it is not strange to find at times a great variety of histologic products. Cutaneous derivatives seem to predominate, especially hair and sebaceous material. Teeth, bone, cartilage, glandular tissue, mucous and serous membranes, muscle and nerve fibers, and cerebral substance are found. Violet, as early as 1907, reported one case of dermoid cyst containing thyroid tissue, and another containing lymphatic tissue.

Before considering diagnosis and treatment of these tumors a few clinical facts should be stated. First, as to the relative frequency of their occurrence. A report from the Mayo clinic states that in a thousand ovarian specimens 98, or nearly 10 per cent, were dermoids. Of these 14 per cent were double, and 7 per cent were malignant. They occur at any age, having been found in premature infants and in a woman of 84 years, but up to the time of puberty they are found more often than any other ovarian tumor. Cattermole reports an interesting case of dermoid cyst of the ovary in a child of eight years, as follows: "Ten days previous to the present sickness she had pain in the abdomen. Present attack began, after running down stairs, with sudden pain in right side and groin. On examination the abdominal muscles were so rigid that the underlying organs could not be made out. Temperature 99° F., no vomiting. An enema brought fecal matter, and was followed by vomiting of undigested food. The next morning the abdomen was relaxed and a round firm tumor mass could be felt in the median line above the pubes. She was operated upon the second day after the attack. Considerable dark fluid was found in the peritoneal cavity. The tumor was dark red in color, the size of a small orange, and attached by a narrow pedicle to the right ovary. The pedicle was twisted twice; the mass contained bone, hair, and several cysts containing bloody serum. Recovery."

Dermoids cause relatively few menstrual disturbances and, apparently, do not favor sterility. Gellhorn reported a case of bilateral dermoid cysts, one of which he removed at the fourth month of pregnancy which continued to term. Later a second pregnancy went to a successful issue, after which the remaining tumor was removed. Wells also reported bilateral dermoids of the ovaries with removal of both, and the pregnancy uninterrupted.

These tumors are usually monolocular and of small size. Their growth is slow, which favors the development of a long pedicle which, in turn, predisposes to twisting, especially during pregnancy. This latter condition is prone to cause severe pain and pressure symptoms and may so interfere with the circulation as to produce inflammation and necrosis, which may lead to more serious complications, as general peritonitis, or fistulae connecting with the urinary bladder and bowel. Quinby reports an interesting case: "A woman aged forty-three, complaining of dysuria, who gave no history of previous illness except that when she was 23 years old she had an attack of 'peritonitis.' About four months before entering the hospital she suddenly noticed that urination was painful, and this had persisted ever since. The urine was turbid, but never any hematuria, gradually dysuria, and frequent micturition increased, which was not relieved by emptying the bladder. Finally walking became painful. At the time of operation it was found that a dermoid cyst of the right ovary, containing hair and pultaceous material, filled the entire true pelvis and communicated with the vault of the bladder."

While as a rule these tumors do not attain a size much above that of a man's fist, they occasionally grow very large, as illustrated in a case reported by Michinard. His patient, (colored) aged thirty-one, had four children, labors normal, three miscarriages. Menstruation always normal except during the past 18 months, when flow became more profuse and of longer duration. She complained of frequent attacks of abdominal pain for about two years, no typical attacks of appendicitis pain. On examination the lower abdomen was felt to be filled with a movable doughy-like mass, somewhat inclined to the right. From the consistency of the tumor a dermoid cyst was diagnosed. Operation revealed a 6½ pound dermoid, filled with sebaceous matter and kinky hair. Tumor was freely movable and easily extirpated. Left ovary normal. Recovery.

The length of pedicle often admits of extreme and unusual transposition as illustrated by Teller and Block. The cysts were typical dermoids, each about the size of a peach, the unusual features being that both cysts were on the right side. This was due to the fact that the left cyst had migrated behind the uterus, passed around the outer side of the pedicle of the right cyst and, after completely encircling it, had dropped between the right tube and its own pedicle into the culdesac.

In so doing, it had strangulated itself and was practically free in the pelvis.

The foregoing clinical facts aid greatly in making a diagnosis. Furthermore the predominant quality of the cyst contents may help, for example, if there is much hair, it is possible to get a characteristic crepitation, if there are many teeth and bony fragments these may be recognized by the examining fingers. Johnson says, "Dermoids with a large amount of putty-like contents may be indented by the examining fingers and these indentations may remain some time as in edema." Küstner says that these tumors, when unattached, have a tendency to float in front of the uterus. The case reported later by the writer confirms this statement. In view of the fact that so many of these neoplasms contain bone and teeth, the radiograph is of very great value. This is well brought out in a report of a case by Fagge. The patient, age 27, had at first diffuse abdominal pain, later it was of a colicky nature with nausea but no vomiting. Renal colic, due to calculus, was at first suspected; but x-ray showed two teeth at the level of the pelvic outlet; the root canals showing distinctly in the plate. X-rays of kidneys showed no evidence of calculi. After being sent to the surgical ward the patient suddenly began to vomit violently, became distended and tympanitic, showing signs of pressure on ureter and intestinal obstruction; previous to attack of obstruction she had suddenly passed an unusually large quantity of urine, suggesting that the renal symptoms at the early stage were due to temporary hydronephrosis. Laparotomy disclosed two ovarian cysts, firmly impacted in the pelvic brim. Both were multilocular, contained hair and the usual pulpy matter; teeth were found in the right cyst; the left cyst evidently pressed on the pelvic colon causing the obstructive symptoms. Both cysts were extirpated, no trace of ovarian substance or of supernumerary ovaries could be seen macroscopically. Recovery uneventful. Teeth in right cyst were about as long as adult canines; no other traces of dental or bony matter were found; a few calcified areas were observed in the debris. Notwithstanding the foregoing, the fact remains that a very small percentage of these tumors are diagnosticated before operation or autopsy.

In the matter of treatment there are a few established rules. Remove the tumor always by the abdominal route. Operate as soon as diagnosis is made; this is especially urgent when there is a co-existing pregnancy. When a dermoid is associated with uterine fibromata it should be removed with the uterus. Carefully scrutinize the opposite ovary. To illustrate the importance of this injunction I quote from a report of a case by Campbell: "A woman, aged forty, one child aged sixteen; no miscarriages; complained of colicky pains at nearly every menstrual period, otherwise her health was normal. On examination she was found to be tender about the appendix. She had a small cystic tumor, apparently of the left ovary, in Douglas' pouch. The right ovary was felt near the pelvic brim and seemed to be normal. Abdominal section was



performed. The left ovary proved to be cystic, prolapsed and was removed. The right ovary was a little enlarged and had a fluctuation feel. The greater part was excised. Both ovaries were found to be dermoid. The patient's symptoms were referred to the right ovary, which was not prolapsed, but contained a deep-seated cyst, bounded all around by ovarian tissue, which it was stretching as it gradually grew. This ovary was so normal in appearance that it was nearly left behind. Its tense cystic feel, and the fact that the pain was referred to the right side led to its getting more attention than it, at first sight, appeared to deserve, and terminated in its removal." On the other hand it is important to conserve as much ovarian tissue as possible in accord with the rule laid down by Schroeder in 1882.

In view of the fact that it is impossible to differentiate ovarian cysts that have been infected, it should be the rule that none of these cysts be tapped at time of the operation. Graves says: "The cyst content is proteolytic and corrosive, and when discharged into the abdomen by rupture of the cyst is conducive to peritonitis." The qualifying word "conducive" is well chosen because it is a well-known fact that the contents of these cysts have often escaped into the peritoneal cavity without any ill result. Graves also calls attention to the fact that, "Malignant change may take place in some part of the included tissue, most commonly of the epithelial type and next frequently of the thyroid tissue." Furthermore, these tumors are vulnerable to hematogenous infection; one notable case has been reported in which the typhoid bacillus was found. Therefore, never aspirate; and prevent, if possible, the escape of any of the contents of these tumors into the abdominal cavity.

#### CASE REPORT

Mrs. D., aged twenty-five, married four years, the mother of two children, two and one half years and nine months old, respectively. Family history good. In childhood she had all the communicable diseases incident thereto, plus typhoid fever. Following this her health had been remarkably good. Her menstrual life began at fourteen, was of the 28 day type, normal, and only interrupted by two pregnancies and subsequent lactation periods. She had no miscarriages.

This patient was referred to me by her family physician, March 21, 1920. She gave a history of cramp-like pain, five months previous, in the lower left quadrant of the abdomen, following a short horse-back ride. This pain was very severe and was accompanied by intestinal obstruction and a constant desire to urinate. However, she was soon relieved by an anodyne and a short stay in bed. Following this attack she discovered a round lump, easily felt, above the rim of the pelvis and a little to the right of the midline. She noted also that this tumor would disappear when she assumed the recumbent posture. Five days before coming under my observation she lost her balance in stepping from a chair to the floor and was again seized with violent pain accompanied by frequent micturition similar to, but more severe and persistent, than in the previous attack. Each physical examination of the patient was followed by pain, lasting for some hours. The examination revealed a tumor about the size of a large orange anterior to and a little to the right of the uterus. It could be displaced without moving the uterus, but this caused great pain. Apparently there was a marked increase in the size of the tumor during the few days she was

under observation. This led to a preoperative diagnosis of a cystoma of the left ovary with hemorrhage into the cyst. Celiotomy was performed March 24, 1920, through a median incision, and the tumor removed without difficulty. It was somewhat larger than a man's fist, very dark in color, and highly congested. The pedicle was tightly twisted. The tumor was monolocular and contained about 1000 c.c. of oily fluid, sebaceous material, a small tuft of light-brown hair, a fairly well formed lower jaw bone, ten well-formed teeth and a few irregular pieces of bone and cartilage. The symptoms were easily accounted for by the torsion of the pedicle and the mechanical interference with the function of the bladder and bowel. The patient made a prompt recovery and was discharged from the hospital April 11, 1920.

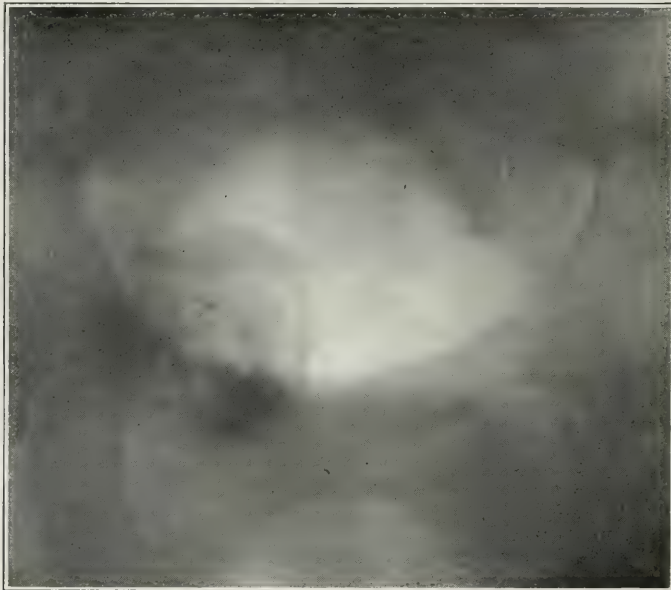


Fig. 1.—Roentgenogram showing outline of air filled bladder with overlapping shadow of ovarian dermoid cyst containing teeth and lower mandible.

The writer, in reporting this case with its mistaken diagnosis, has been prompted by a desire to emphasize the fact that the mistake would have been avoided if we had called to our assistance a competent radiographer. The treatment and result would have been the same. But it is always a great gratification to a surgeon, and worthy of his best endeavor, to have his operative findings agree with his preoperative judgment.

In submitting herewith a radiographic print of the tumor (Fig. 1), above described, placed as near as possible to the position it had occupied, it is with the single purpose of calling attention to the advantage of an air filled bladder, in order to get a background in sharp contrast to the tumor outline. Finally, it is suggested that in addition to the foregoing, a stereoradiograph of all suspected dermoids would still better demonstrate their size, character of content, and relative position.

## THE STATUS OF INTRAUTERINE STEM PESSARY BASED ON A STUDY OF 205 CASES WITH END RESULTS IN 117 CASES\*

By REGINALD M. RAWLS, M.D., F.A.C.S., NEW YORK, N. Y.

THE intrauterine stem pessary has been used for a little over a century and numerous articles have been published setting forth its therapeutic value, but up to the present time its status is still undetermined. In a recent "Year-book on Gynecology and Obstetrics" appeared an abstract of an article which claimed that the stem pessary was of value in certain conditions and immediately following was the Editor's note stating that "the stem pessary is dangerous and of doubtful value in any condition." Therefore it will be my endeavor, in the following study, to attempt to establish the status of the intrauterine stem pessary.

From October 1, 1915, to September 30, 1919, there were treated in the Woman's Hospital 9,003 patients on whom were performed 15,823 operations. During this period 205 intrauterine stem pessaries were inserted which gives for this operation 2.3 per cent of the patients under treatment and 1.3 per cent of the operations performed. For this period 309 patients had either dysmenorrhea, amenorrhea, sterility, anteversion of the uterus, congenital malformation of the uterus, or stenosis of the cervix. In such conditions the stem is most often indicated and yet, in this series, it was used in only 51.7 per cent of the cases. Thus this series, by twenty-eight surgeons in 96 private and 109 ward cases, would seem to represent the conservative use of the stem and its analysis should obviously give us a better average primary and end result than the study of a series of cases of an individual operator.

The indications for employing the stem were: dysmenorrhea in 107, or 52.2 per cent; sterility in 47, or 22.9 per cent; dysmenorrhea and sterility in 23, or 11.2 per cent; conditions other than dysmenorrhea or sterility in 15, or 7.3 per cent; and in 13 of the private cases indications for the operation were not obtained. Insertion of the stem alone was done in 147 cases, combined with minor operations in 13 cases and combined with major operations in 45 cases. Preliminary to insertion of the stem divulsion and curettage, with sharp curette, were used 173 times; divulsion and curettage, with dull curette, 11 times; and divulsion alone 21 times. The curettings were examined microscopically in only 48 cases and showed normal endometrium in 33, or 68.8 per cent; hyperplasia in 10, or 20.8 per cent; and interstitial changes in 5 or 10.4 per cent.

We have records in 186 cases which show that the hard rubber or Davenport stem was used in 102, or 54.8 per cent; the glass stem in 80,

\*Read by title before the American Gynecological Society, May, 1920, and in abstract before the New York Obstetrical Society, November 9, 1920.



or 43 per cent, the straight or Baldwin in 40 and the curved or Ward in 40; and the "Wylie drain" in 4, or 2.2 per cent. For 124 cases the stem remained *in situ* in 16 under one month; in 36 from one to two months; in 24 from two to three months; in 15 from three to four months; in 3 from four to five months; in 1 for five months; and in 29, or 23.4 per cent the stems cut out in part or in whole. Of these 29 cases, in 20, or 69 per cent, the glass stems were used, 15 curved and 5 straight, and in 9, or 31 per cent, the hard rubber stems were used. The methods for securing the stems were for the hard rubber two to four individual sutures of silkworm gut and for the glass two to four point suspension sutures of the same material secured by shot and washers or bone buttons and in only one case was silver wire used.

#### I. SEQUELÆ OF INSERTION OF INTRAUTERINE STEMS

1. *Postoperative Temperature*.—In determining sequelæ our attention is first directed to the postoperative temperature curve and a study of this shows that in 147 cases of insertion of the stem with a preliminary divulsion or divulsion and curettage, sharp or dull curette, the temperature remained below 100° F. in 90 or 61 per cent; ranged from 100° F. to 101° F. in 50, or 34 per cent; and ranged to 101° F. and above in 8, or 5 per cent. If we consider the temperature below 101° F. as a normal operative reaction it will be necessary to analyse only 8 of these cases. In 7, or 87.5 per cent, a preliminary divulsion and curettage, with a sharp curette, was done and in 1, or 12.5 per cent, a divulsion alone preceded the insertion of the stem. In none of these cases is a microscopic examination of the endometrium recorded and as it is a rule of the hospital to send all tissue to the pathologist for diagnosis it is reasonable to assume that the curettings were macroscopically normal or that the curettage was only a matter of routine. However, all things being equal it seems, in insertion of the stem, the preexisting condition of the endometrium is not a factor in the postoperative rise of the temperature for in 48 cases in whom a microscopic examination was made but 5, or 10.4 per cent, showed interstitial changes and but 10 or 20.8 per cent, showed hyperplasia and of the former only one and of the latter only two had a rise of temperature to 100.8° F. Nevertheless it is interesting to note that the sharp curette was used in all of the cases except one in whom there was a postoperative rise above 101° F.

A further analysis of the cases with the high postoperative rise of temperature in which a divulsion and curettage preceded the insertion of the stem shows in two of them a preoperative diagnosis of salpingitis and also in one of these there was an endocervicitis and a positive Wassermann. In both of these, it seems to the writer, there were contraindications to the use of either the curette or the stem. In a third case there was a postoperative pyelitis or cystitis which might have occurred after

any operative procedure or even after an examination under an anesthetic. The following are abstracts of these three cases.

CASE 1.—Exacerbation of a chronic salpingitis, Mrs. N., thirty-five, married five years but never pregnant. Chief complaint, pain and swelling of lower abdomen and primary sterility. Left tube palpable and tender and a diagnosis of salpingitis made. Patient under observation for fifteen days during which time a study, with x-ray, was made of the gastrointestinal tract and at no time was the temperature higher than 99° F. Under anesthesia on the sixteenth day a diagnosis of primary sterility was made and a divulsion and curettage and insertion of stem pessary was done. No microscopic examination of the curettings is recorded. Three days later there was a foul vaginal discharge and the stem pessary was removed and douches ordered, but the following day the discharge was thick, yellow, and very offensive. Up to this time the highest temperature was 99° F. but the evening of the next or fifth day the temperature rose to 102.8° F. and patient complained of intense abdominal pain accompanied by persistent nausea and vomiting. At the end of another twenty-four hours the temperature still registered 102° F. and did not return to normal until the fourteenth day after operation. Patient last examined three months after operation and the cervix was eroded and there was a mucopurulent vaginal discharge and the left adnexa was thickened and tender to palpation.

*Comment.*—The divulsion, curettage and insertion of the stem caused the acute exacerbation of a chronic tubal condition but the blame for this should be charged to the operator rather than to the operation.

CASE 2.—Suspected salpingo-oophoritis. Positive Wassermann and chronic endocervicitis. Mrs. C., twenty-eight, never pregnant. Complained of a drawing pain in right lower quadrant, sacral backache and vaginal discharge of ten years' standing. A preliminary diagnosis was made of bilateral salpingo-oophoritis but was not substantiated under anesthesia and the patient was subjected to a divulsion, curettage and insertion of a straight glass stem. Examination of the blood showed a weak positive Wassermann but no microscopic examination of the curettings is recorded. On the operative history appears the following note: "On account of an infected cervical discharge (purulent) the cervix was thoroughly curetted with a sharp curette and an application of tincture of iodine made before the stem was introduced." Strange to record is the fact that in six hours the temperature only rose to 101.2° F. and in another twenty-four hours it was normal and so remained until the patient's discharge. Patient seen four months later and no comment is recorded except that the uterus was anteфлекed.

*Comment.*—Fortunately no grave morbidity followed but if such had been the case it should be charged to the operator rather than to the operation, for there were contraindications to any intra-cervical or intrauterine operation.

CASE 3.—Postoperative pyelitis or cystitis. Mrs. P., twenty-five, never pregnant. severe dysmenorrhea and dyspareunia. Diagnosis, anteфлекion. Five days preceding operation the temperature rose from 97° F. to 98.6° F. Divulsion, curettage and insertion of curved glass stem held in place by two points suspension suture of silver wire secured by shot but stem cut out while patient was still in hospital. No microscopic examination of the curettings was recorded. For five days following operation temperature ranged from 98.6° F. to 99.6° F. but at noon of the sixth day it rose to 102.4° F. and the next morning it was 99.4° F. but in the afternoon rose to 102° F. There was an afternoon rise until the ninth day when the temperature reached normal where it remained until patient's discharge the eleventh day. The bedside notes of this case have been lost, but from the remaining history we find that patient had to be catheterized but once and that the urine was reported to be normal

before operation, but one day afterwards it contained a trace of albumin and masses of pus cells. The morning after the first rise of the temperature, the seventh day, there was a faint trace of albumin, pus cells, and shreds of mucus. The eleventh day albumin was not present but there were a few pus cells. Patient seen five months later; while there was no return of her symptoms, her dysmenorrhea was not relieved.

NOTE: The temperature in this case was caused by a pyelitis or cystitis and was in no way due to the particular form of operation. It might have followed any operative procedure or even an examination under an anesthetic.

Thus there remain but 5, or 3.4 per cent, with a postoperative rise of temperature above 101° F. which should be regarded as a sequela of the insertion of the stem pessary or its accompanying divulsion or divulsion and curettage, and a review of the following abstracts will show that the high temperature was of short duration and was followed by no permanent morbidity.

CASE 1.—Mrs. G., thirty, married five and a half years, and never pregnant although two years before she had been curetted. Her chief complaint was primary sterility and a diagnosis was recorded of antelexion. A divulsion, curettage and insertion of a Davenport stem, held in place by four silkworm-gut sutures, was done. Postoperative temperature from 98.4° F. to 100° F. until the fourth day when it rose to 101.2° F., but in four hours it was normal and remained so until patient's discharge the tenth day. No microscopic examination of the curettings is recorded. Stem was removed at the end of two months and patient examined eight months later and the uterus was antelexed, adnexa normal and patient was still sterile.

CASE 2.—Mrs. B., twenty-nine, married two years but never pregnant. Complained of dysmenorrhea and primary sterility; diagnosis made of antelexion. Temperature for the four days before operation ranged from 97° to 98° F. and a divulsion, curettage and insertion of a straight glass stem was done. No microscopic examination of the curettings is recorded. Four hours later temperature rose to 101.2° F. but in thirty-six hours it dropped to normal, where it remained until patient's discharge the sixth day. No follow-up was possible in this case.

CASE 3.—Mrs. B., twenty-five, never pregnant. Complained of dysmenorrhea and irregular menstruation. During the four days preceding operation temperature from 96° F. to 98.8° F. Divulsion, curettage and insertion of straight glass stem held in place by two point suspension suture of silkworm-gut. No microscopic examination of the curettings recorded. Six hours after operation temperature rose to 101.6° F. but was normal the next morning and ranged from 98° F. to 99° F. until patient's discharge, the seventh day. The stem was removed at two and a half months and patient seen seventeen months after operation and was relieved of dysmenorrhea but was just as irregular as before operation.

CASE 4.—Mrs. J., twenty-six, never pregnant. Complained of dysmenorrhea and a diagnosis of antelexion was made. Divulsion, curettage and insertion of a Davenport stem. No microscopic examination of the curettings recorded. Temperature normal before and twenty-four hours after operation but four hours later it rose to 101.8° F. and in another four hours it rose to 103.4° F. Patient complained of being very uncomfortable, there was headache and profuse perspiration. She was given phenacetine and caffeine and at the end of four hours temperature was 99.2° F. The succeeding four days the temperature rose from 98° F. to 99° F. and patient was discharged on the fifth day. Last seen one year after operation, she was in good condition and the dysmenorrhea was improved.



CASE 5.—Mrs. M., twenty-eight, never pregnant. Complained of sterility and amenorrhea for twenty months. Diagnosis made of ante flexion. The cervix was thoroughly divulsed, curved glass stem was inserted and held in place by three point suspension suture of silkworm-gut. The temperature was normal before operation but six hours afterwards it rose to  $102^{\circ}$  F. but in twelve hours it was  $100^{\circ}$  F. and for twenty-four hours ranged from  $100^{\circ}$  F. to  $100.4^{\circ}$  F. and then normal for three days, at which time patient was discharged. The follow-up shows that this patient became pregnant but miscarried.

In determining the sequelæ other than the postoperative rise of temperature it is necessary to follow the cases after their discharge from the hospital and this has been possible in only 102 of the 147 cases, or 69.4 per cent, of those in whom the insertion of the stem was accompanied by no other operative procedure except divulsion or divulsion and curettage. Therefore our percentages will now be based on the cases seen for at least one month after operation.

2. *Retroversion*.—(Four cases of 102, or 3.9 per cent.) It is the experience of the author that retroversion of the uterus may be caused by the stem pessary, which observation is borne out by this study. This occurs most often after the use of the Davenport stem as there is a knob which extends into the vagina and causes the posterior wall of the vagina and the fecal column in the rectum to carry the cervix forward and thus retrovert the uterus. However, it may happen with a smooth glass stem when it ceases to be entirely intrauterine, because a suture was tied too loosely or cuts out from its high position in the cervix. The following are the abstracts of the four cases in which retroversion was caused by the stem, and shows that the Davenport stem was probably used in three of them, and that the retroversion was permanent in three of the four cases.

CASE 1.—Miss H., twenty-six, complained of severe dysmenorrhea and vomiting. Diagnosis made of ante flexion and a divulsion and curettage and insertion of a straight glass stem was done. Curettings not saved for microscopic examination. Temperature after operation from  $98^{\circ}$  F. to  $99.8^{\circ}$  F. but on the eleventh day there was severe backache and an examination showed the uterus to be retroverted and the stem was removed. Four months later the uterus was retroflexed and dysmenorrhea was unrelieved.

CASE 2.—Mrs. R., nineteen. Complained of dysmenorrhea and vaginal discharge. Diagnosis made of infantile uterus, and divulsion, curettage with dull curette, and insertion of Davenport stem was done. No microscopic examination of the curettings recorded. Temperature after operation from  $98^{\circ}$  F. to  $100^{\circ}$  F. and convalescence normal, but on discharge, the eighth day, uterus was found retroverted and the stem was removed. Six months later uterus in normal position and patient relieved of dysmenorrhea.

CASE 3.—Miss G., twenty-three. Complained of dysmenorrhea and diagnosis made of ante flexion. Divulsion, curettage and insertion of stem. The stem used is not specified but it was probably the Davenport as this was most often used by this operator. Microscopic examination of the curettings showed interstitial endometritis but the temperature only ranged from  $98^{\circ}$  F. to  $100^{\circ}$  F. Patient seen ten weeks

after operation. The dysmenorrhea was unrelieved and the uterus was still retroverted but the adnexa were normal.

CASE 4.—Mrs. T., thirty-two. Complained of dysmenorrhea and diagnosis made of antelexion. A divulsion, curettage and insertion of a Davenport stem was done. The postoperative temperature ranged from 97° F. to 99.2° F. On discharge the uterus was found to be retroverted and the stem was removed. Patient, seen seventeen days after operation, was relieved of the dysmenorrhea, but the uterus was still retroverted.

3. *Irregular Menstruation*.—(Five cases of 102, or 4.9 per cent.) In 5 cases, or 4.9 per cent, there were menstrual irregularities such as amenorrhea, menorrhagia, frequency or increased dysmenorrhea. The most severe were the cases of menorrhagia which occurred with the stems *in situ* and necessitated their removal. The following are abstracts of these cases:

CASE 1.—Mrs. A., twenty-seven. Pain before and throughout her menstrual period which is scanty with clots, otherwise normal as to time and duration. Diagnosis of antelexion and a divulsion, curettage and insertion of Davenport stem. Curettings not saved for microscopic examination. Five weeks later patient reports that she has had a normal menstruation although stem was still *in situ*. In her fifth month after operation she reported that she had missed two periods but examination failed to reveal any evidences of pregnancy. In her sixth month she reported that the menstruation was now normal and that there was pain only before instead of throughout her period.

CASE 2.—Mrs. G., twenty. Backache and pains in lower abdomen for four weeks and secondary sterility. Diagnosis of stenosis of the cervix and antelexion. Divulsion, curettage and insertion of a Davenport stem. Microscopic examination of the curettings showed premenstrual uterine mucosa. Stem removed at end of four weeks, and four and a half months later patient reported that on two occasions she had menstruated twice in a single month. Previous to operation her menstruation had always been every twenty-eight days and of two days duration.

CASE 3.—Mrs. K., twenty-eight. Dysmenorrhea. Diagnosis of antelexion and divulsion, curettage and insertion of a Davenport stem. No report of the microscopic examination of the curettings. For two years previous to operation menstruation irregular as to time, three to five weeks, or three to five days duration and moderate in amount, with dysmenorrhea. One year after operation patient reported that menstruation was unchanged except that the dysmenorrhea was much more severe.

CASE 4.—Miss C., twenty-six. Essential dysmenorrhea and at times a profuse thick white to yellow leucorrhea. Diagnosis of antelexion and endocervicitis divulsion, curettage, and insertion of a straight glass stem. Curettings small in amount and not saved for examination. Three weeks later menstrual period most profuse and accompanied by severe uterine colic. Medicinal measures and an ice-bag resorted to but flow became hemorrhagic in character and did not let up until stem was removed. Patient last seen several months later; while the menorrhagia had not recurred, the dysmenorrhea was not relieved.

CASE 5.—Mrs. H., twenty-eight. Essential dysmenorrhea. Diagnosis of stenosis of the cervix and antelexion; divulsion, curettage and insertion of Davenport stem. No microscopic examination of the curettings recorded. Four weeks later patient was seized with severe menorrhagia and stem had to be removed. Patient seen ten months later and there had been no further menorrhagia and the dysmenorrhea was relieved.

4. *Parametritis*.—(Three of 102 cases, or 2.9 per cent.) In three cases or 2.9 per cent there was evidence of a parametritis which was elicited by vaginal examination, as shown by tender thickening or exudate either in the lateral fornices or posterior to the uterus. The following abstracts of these cases show no permanent morbidity.

CASE 1.—Mrs. L., twenty-six. Complained of pains in the flanks, headache and menorrhagia. Diagnosis of ante flexion and undeveloped and retrocessed uterus; divulsion, curettage and insertion of stem was done. The stem was probably a Davenport, as this form was most often used by this operator. Stem *in situ* for two months and when examined five and a half months after operation patient reported relief of symptoms but a bimanual examination showed the uterus retrocessed with an area of tenderness on its posterior surface. Previous examinations made, respectively, at the second and third months, did not disclose this tenderness and it is a debatable point as to whether the stem caused this condition.

CASE 2.—Mrs. L., twenty-nine. Secondary sterility and amenorrhea for three months. Diagnosis of prolapsed ovary and sterility; divulsion, curettage and insertion of Davenport stem. Microscopic examination of the curettings showed normal uterine mucosa of the premenstrual type. Stem removed at three months and vaginal examination showed a small amount of thickening in the broad-ligament. One month later the thickening had disappeared but patient still had amenorrhea.

CASE 3.—Mrs. F., twenty-six. Dysmenorrhea with a diagnosis of ante flexion and divulsion, curettage and insertion of a Davenport stem. Microscopic examination of the curettings showed interstitial endometritis and hyperplasia of the uterine mucosa. The highest postoperative temperature was 100° F., the convalescence was uneventful, and patient was discharged the eleventh day. Six weeks later there was a slight exudate in the left broad ligament, and although the stem was not removed for another month, there is no record of any exudate present at this time.

5. *Adnexal Disease*.—(Eight of 102 cases, or 7.8 per cent.) In eight of the one hundred and two cases there were, following the use of the stem, varying degrees of adnexal disease. But with careful study half of these cases should have been avoided, for in four there were recorded preoperative diagnoses of either salpingitis, or endocervicitis or pelvic conditions requiring abdominal section. Thus the unavoidable occurrence of adnexal disease following the use of the stem in our series was 3.9 per cent.

CASE 1.—(See case 1 under *Postoperative Temperature*.)

CASE 2.—Mrs. A., twenty-eight. Chief complaint dysmenorrhea and leucorrhea and for two years abdominal and rectal pain. Appendectomy fifteen months ago at Woman's Hospital and at this time the adnexae were normal and there were no pelvic adhesions. Present examination showed both tubes slightly enlarged and tender with an ante flexed uterus. The latter diagnosis was verified under anesthesia, and a divulsion, curettage and insertion of a curved glass stem was done. Microscopic examination of the curettings showed normal uterine mucosa of the premenstrual type. Uneventful recovery, highest temperature 99.8° F. and patient was discharged the eighth day after operation.

Patient readmitted ten months later still complaining of previous symptoms except there was relief of dysmenorrhea. A bilateral salpingectomy and separation of adhesions was done and the microscopic examination showed perisalpingitis and circu-



latory disturbances of both tubes. Ten days after operation patient died of shock and septic peritonitis.

*Note.*—From a review of this history it seems justifiable to conclude that the patient had a salpingitis when the stem was introduced and as there was no acute exacerbation, the mortality should not be charged to the stem.

CASE 3.—Mrs. W., twenty-seven, a private case and records incomplete. Dysmenorrhea and sterility with a diagnosis of undeveloped retroverted uterus with stenosis of the cervix and laparotomy advised but refused. Therefore a divulsion, curettage and insertion of a Davenport stem was done. Patient remained in the hospital one week after operation and temperature ranged from 98° F. to 99.8° F. On the fifteenth day there were severe abdominal pains and the stem was removed. Several weeks later patient was subjected to a total hysterectomy for pelvic infection.

CASE 4.—Miss O., twenty-seven. Dysmenorrhea with a diagnosis of antelexion and endocervicitis; Divulsion and insertion of a Davenport stem. The postoperative temperature was never above 100° F. and patient discharged the ninth day with the following note "stem and uterus in good position, no erosion of the cervix, no leucorrhea and adnexæ normal." One month later patient reported the dysmenorrhea was still present and an examination showed bilateral adnexal disease. Patient treated in O.P.D. and at the end of a year the leucorrhea and adnexal disease had cleared up, but the dysmenorrhea was unrelieved.

CASE 5.—Mrs. E., twenty-four. Dysmenorrhea with diagnosis of acute antelexion and infantile uterus. Divulsion and insertion of a straight glass stem. Highest postoperative temperature 100.8° F. and patient discharged the twelfth day. One week later she had severe uterine pain and stem was expelled. On examination both lips of the cervix were found bisected and there was tenderness and thickening of both adnexæ. After two months' treatment in the out-patient department, the salpingitis cleared up although patient complained of pain in the right lower quadrant of the abdomen and at the end of seven months the patient reported that she was relieved of symptoms and that the last menstruation was free of pain.

CASE 6.—Mrs. M., twenty-six. Complained of painful urination and dysmenorrhea and a divulsion, curettage and insertion of a Davenport stem was done. No microscopic examination of the curettings recorded. Highest postoperative temperature 100° F. Six weeks later the dysmenorrhea was unrelieved and there was a considerable amount of leucorrhea and one month still later there was found slight tenderness in the left fornix. Two weeks after this the stem was removed and it was recorded that there was a good symptomatic result.

CASE 7.—Mrs. K., twenty. Primary sterility with diagnosis of antelexion. Divulsion, curettage and insertion of a Davenport stem. No microscopic examination of the curettings recorded. Highest postoperative temperature 99.6° F. At the second week the stem was removed as a salpingitis had developed and fifteen months after operation patient was still sterile and had adnexal disease.

CASE 8.—Mrs. G., twenty-seven. Dysmenorrhea and primary sterility with a diagnosis of antelexion and stenosis of the cervix. Divulsion, curettage and insertion of a Davenport stem. No microscopic examination of the curettings recorded. Stem removed the seventh day because of pelvic pain and tenderness. Patient seen one year after operation and the dysmenorrhea was relieved but she was still sterile.

6. *Uterine Colic.*—(Two Cases of 117, or 1.7 per cent.) Two of the 117 cases which were followed, or in 1.7 per cent, the stem caused uterine colic which was not relieved until the stem was removed. These

cases may have been mild grades of salpingitis but they are not so classified as a review of the following abstracts will show that the pain quickly subsided on removal of the stem and there was no further evidence of tubal involvement.

CASE 1.—Mrs. B., thirty. Dysmenorrhea and primary sterility. Divulsion, curettage and insertion of a curved glass stem. Microscopic examination of the curettings showed hyperplasia of the uterine mucosa. Highest postoperative temperature 100.6° F. On the tenth and eleventh day patient had severe uterine cramps which were not relieved until the twelfth day when the stem was removed. Fifteen months later patient reported that the dysmenorrhea was greatly improved but that she was still sterile.

CASE 2.—Miss W., twenty-eight. Dysmenorrhea with diagnosis of ante flexion and left salpingo-oophoritis. Divulsion, curettage and insertion of a curved glass stem, left salpingo-oophorectomy and appendectomy. Pathologic diagnosis salpingitis isthmica nodosa simplex. On the ninth day there were severe uterine cramps which ceased when stem was removed. Highest postoperative temperature 100.8° F. Eleven months later the dysmenorrhea was improved but patient had contracted pulmonary tuberculosis.

## II. SEQUELÆ OF INTRAUTERINE STEM AND MINOR OPERATIONS

There were sequelæ in two cases in which minor operations were done in addition to insertion of the stem. These can hardly be charged to the stem pessary as there were cutting operations on the cervix or the uterus and in one of the cases there was a dissection of the vagina. The following are abstracts of these cases:

CASE 1.—Mrs. B., twenty-three. Dysmenorrhea and secondary sterility with ante flexion, divulsion, curettage, incision of the internal os and an insertion of a curved glass stem. Microscopic examination of the curettings showed hyperplastic premenstrual uterine mucosa. First twenty-four hours patient complained of severe headache, but highest temperature 100° F. The second day there was severe abdominal pain with tympanites which was relieved by an enema. The temperature remained normal until 8 P.M., the beginning of the third day, when it rose to 102° F., and patient complained of being very nervous and generally uncomfortable. Sponge bath and ice-bag to abdomen and in twenty-four hours temperature was 101° F., but did not remain normal until the seventh day. During this time patient complained of abdominal pains and cramps. The seventeenth day stem was removed as the suture had cut through the posterior lip of the cervix. No follow-up was possible in this case.

CASE 2.—Mrs. M., thirty. Primary sterility with a diagnosis of infantile ante flexed uterus. Divulsion, curettage, vaginal hysterotomy and insertion of a curved glass stem. Microscopic examination of the curettings showed premenstrual uterine mucosa. In twenty-four hours the temperature rose to 102.8° F. and patient was restless and the abdomen distended. Symptoms relieved by an enema but for another twenty-four hours temperature was still 102° F. A further study of the case showed the symptoms to be due to a *B. coli* infection of the bladder. The temperature became normal the fourth day and patient was discharged the eighth day. Patient last heard from thirteen months after operation and was still sterile.

## III. SEQUELÆ OF INTRAUTERINE STEM AND ABDOMINAL OPERATIONS

Of the 45 cases on whom abdominal operations were performed in addition to insertion of the stem pessary, we are able to follow-up but 32, or 71.1 per cent, and we find sequelæ in 7, or 21.9 per cent. However, the following review of the operations performed and the sequelæ seem to prove that in four of these cases the intraabdominal work rather than the insertion of the stem pessary was the cause of the morbidity.

CASE 1.—Myomectomy, resection of the left ovary, and right tube, shortening of the round ligaments and ventral suspension. At the end of seventeen months there was a slight exudate in the right broad ligament.

CASE 2.—Right salpingo-oophorectomy, appendectomy and separation of adhesions. At the fourth month there was left adnexal disease.

CASE 3.—Resection of both ovaries, shortening of the round ligaments and appendectomy. At the third month there was pelvic pain and sensitive adnexæ.

CASE 4.—Resection of the left ovary, shortening the round ligaments, ventral suspension and appendectomy. At one month there was left-sided pelvic pain and the left tube and ovary were enlarged and tender.

In 3 cases, or 9.4 per cent, the insertion of the stem pessary was probably the cause of the sequelæ as a review of the following abstracts will show:

CASE 1.—Miss K., twenty-four. Dysmenorrhea with stenosis of the cervix and retroversion. Divulsion, insertion of a straight glass stem and Alexander's operation. No microscopic examination of the curettings recorded. Highest postoperative temperature 100.4° F. Two months later patient complained of the left-sided pelvic pain, present since operation, and while the uterus was in good position the left adnexæ were tender but not enlarged.

CASE 2.—Mrs. M., twenty-nine. Primary sterility with diagnosis of retroversion and peritoneal adhesions. Divulsion and insertion of a straight glass stem, shortening of the round ligaments, appendectomy and separation of peritoneal adhesions. One month after operation stem in good position but was removed as both adnexæ were enlarged and tender. One year later patient was still sterile, both adnexæ were enlarged and tender and she also complained of irregular and painful menstruation.

CASE 3—(See Case 2, under Uterine Colic.)

## END RESULTS

In our final analysis of end results we have excluded all cases followed up less than three months and for sterility all cases followed up for less than five months. Thus of the 205 cases we have been able to analyze 117, (53 private and 64 ward), or 57 per cent, of the cases at the Woman's Hospital in which the stem pessary was used from October 1, 1915, to September 30, 1919. This analysis was possible, in ward cases, by the use of the card index of our "Follow-up Clinic" and in private cases through a questionnaire sent to the individual operators. Therefore we have end results of insertion of the stem pessary with its



accompanying divulsion, or divulsion and curettage in 83 of 147 cases, or 56.6 per cent; combined with minor operations in 2 of 13 cases, or 15.3 per cent; and combined with major or abdominal operations in 32 of 45 cases, or 71.1 per cent. These cases were under postoperative observation for varying lengths of time and the following are the percentages for the 117 cases: 54.7 per cent for three to twelve months; 17.1 per cent for twelve to twenty-four months; 23.1 per cent for twenty-four to thirty-six months; and 5.1 per cent for thirty-six to forty-eight months. Of the majority of the cases, or 54.7 per cent, who were followed only during the first year after operation, 23.1 per

TABLE I  
FOLLOW-UP ANALYSIS FOR DYSMENORRHEA (END RESULTS FOR THREE MONTHS OR LONGER)

	NUMBER OF CASES	PARTIALLY RELIEVED	RELIEVED	NOT IMPROVED	PERCENTAGE RELIEVED	PERCENTAGE IMPROVED
A. Insertion of Stem for Dysmenorrhea.						
PRIVATE	14	4	8	2	67.1	85.7
WARD	28	5	13	10	46.4	64.3
Insertion of Stem for Dysmenorrhea and Sterility.						
PRIVATE	8	0	8	0	100	100
WARD	1	0	1	0	100	100
Insertion of Stem for Dysmenorrhea, Appendectomy.						
PRIVATE	2	0	2	0	100	100
WARD	1	0	0	1	0	0
<i>Total</i>						
PRIVATE	24	4	18	2	75	91.7
WARD	30	5	14	11	46.7	63.3
B. Insertion of Stem for Dysmenorrhea, Shortening the Round Ligaments, Appendectomy.						
PRIVATE	5	0	5	0	100	100
WARD	2	1	1	0	50	100
Insertion of Stem for Dysmenorrhea and Sterility, Shortening the Round Ligaments.						
PRIVATE	3	0	3	0	100	100
WARD	1	0	1	0	100	100
Insertion of Stem for Dysmenorrhea, Abdominal Operations.						
PRIVATE	4	2	1	1	25	75
WARD	3	0	1	2	33.3	33.3
<i>Total</i>						
PRIVATE	12	2	9	1	75	91.7
WARD	6	3	3	0	50	66.7
C. Total for Dysmenorrhea.						
PRIVATE	36	6	27	3	75	91.7
WARD	36	6	17	13	47.3	66.3
	72	12	44	16	61.1	77.8

cent were observed for three to six months; 15.4 per cent were observed for six to nine months; and 16.2 per cent were observed for nine to twelve months. Thus while only 45.3 per cent of the cases were followed up after twelve months it seems that any benefit accruing from the use of the stem should occur before this time and therefore it is fair to determine the status of the intrauterine stem from the data in hand.

The end results for private and ward cases have been tabulated separately. For dysmenorrhea we have recorded the findings as improved and not improved and have subdivided improved into partially relieved and relieved and have calculated the percentages under these subdivisions. (See Table I.) For sterility the findings are recorded as relieved and not relieved with the percentage for the former. (See Table II.) Further we have analyzed the results of the use of the stem in cases who did not complain of dysmenorrhea or sterility but in whom an ante flexion of the uterus or a stenosis of the cervix or both seemed to contribute to the symptom-complex. (See Table III, A.) Finally we made a summary of the end results of the use of the intrauterine stem in 117 of the cases which were followed up for three months or longer. (See Table III, B.)

A review of these statistics gives for dysmenorrhea in 24 private cases, 22 of insertion of stem and 2 insertion of stem and appendectomy, improvement in 91.7 per cent, with relief in 75 per cent. For dysmenorrhea in 30 ward cases, 29 of insertion of stem and 1 of insertion of stem and appendectomy, improvement in 63.3 per cent with relief in 46.7 per cent. (See Table I, A.) For primary sterility in 23 private cases, 21 of insertion of stem and 2 with additional operations on the cervix or vagina or both, there was relief in 34.8 per cent. In 12 ward cases, of insertion of stem there was relief of primary sterility in only 8.3 per cent. (See Table II, A.) For secondary sterility the stem was used in but four cases, one private with no relief and three ward, two of insertion of stem with 50 per cent relief and one insertion of stem and abdominal operation with no relief. A total relief of secondary sterility of 25 per cent. (See Table II, D and E.)

If we analyze those cases in whom in addition to the stem the round ligaments were shortened or other intraabdominal operations were done we find that in 12 private cases of dysmenorrhea there was improvement in 91.7 per cent and relief in 75 per cent and in 6 ward cases of dysmenorrhea there was improvement in 66.7 per cent and relief in 50 per cent. (See Table I, B.) For private cases of primary sterility there was relief in 25 per cent and for 4 ward cases of primary and 1 of secondary sterility there was no relief. (See Table II, B and D.) Then if we take stock of all cases of dysmenorrhea and sterility in which the stem was used we have 36 private cases of dysmenorrhea with improvement in 91.7 per cent and relief in 75 per cent, while in 36 ward

TABLE II  
FOLLOW-UP ANALYSIS FOR STERILITY. (END RESULTS FOR 5 MONTHS OR LONGER)

	NO.	RELIEVED	NOT RELIEVED	PER CENT RELIEVED
<i>Primary Sterility</i>				
A. Insertion of Stem for Sterility.				
PRIVATE	14	5	9	35.7
WARD	9	1	8	11.1
Insertion of Stem for Sterility, Dysmenorrhea.				
PRIVATE	7	2	5	28.6
WARD	3	0	3	0
Insertion of Stem for Sterility, Minor Vaginal Operations.				
PRIVATE	2	1	1	50
WARD	0	0	0	0
<i>Total</i>				
PRIVATE	23	8	15	34.8
WARD	12	1	11	8.3
B. Insertion of Stem for Sterility, Shortening the Round Ligaments.				
PRIVATE	2	1	1	50
WARD	3	0	3	0
Insertion of Stem for Sterility, Shortening the Round Ligaments, Appendectomy.				
PRIVATE	2	0	2	0
WARD	1	0	1	0
<i>Total</i>				
PRIVATE	4	1	3	25
WARD	4	0	4	0
C. Total for Primary Sterility				
PRIVATE	27	9	18	33.3
WARD	16	1	15	6.25
	43	10	33	23.25
D. Secondary Sterility				
Insertion of Stem for Sterility.				
PRIVATE	1	0	1	0
WARD	2	1	1	50
Insertion of Stem for Sterility, Abdominal Operation.				
PRIVATE	0	0	0	0
WARD	1	0	1	0
E. Total for Secondary Sterility				
PRIVATE	1	0	1	0
WARD	3	1	2	33.3
	4	1	3	25
F. Total for Sterility				
PRIVATE	28	9	19	32.1
WARD	19	2	17	10.5
	47	11	36	23.4



cases of dysmenorrhea there was improvement in 66.3 per cent and relief in 47.2 per cent. Likewise in 27 private cases of primary sterility, there was relief in 33.3 per cent with 1 case of secondary with no relief, while in 16 ward cases of primary there was relief in 6.25 per cent and 3 cases of secondary with relief in 33.3 per cent. (See Table II, C, D, and E.)

TABLE III

FOLLOW-UP ANALYSIS OF SYMPTOMS OTHER THAN DYSMENORRHEA AND STERILITY WITH ANTEFLEXION OR STENOSIS OF THE CERVIX CONTRIBUTING TO THE SYMPTOM-COMPLEX. (END RESULTS FOR 3 MONTHS OR LONGER)

	NO. CASES	PARTIALLY RELIEVED	RELIEVED	NOT IMPROVED	PER CENT RELIEVED	PER CENT IMPROVED
A. Insertion of Stem.						
	5	1	1	4	20	40
Insertion of Stem, Abdominal Operation.						
	3	0	2	1	66.6	66.6
	8	1	3	5	37.5	50
B. Summary of Follow-up Analysis						
	127*	13	58	57	45.7	55.9

\*Only 117 patients were followed up but 10 had been treated for both dysmenorrhea and sterility and have been analyzed under both of these headings.

The higher percentage of successful results in the private cases when compared to the ward cases seems to be due to a more careful study and selection of the former for the use of the stem. This seems to be borne out by the fact that in this series of cases 66.6 per cent of the sequelæ occurred in the ward cases. Thus the failure to obtain results by the use of the stem or the deplorable sequelæ following its use should be more often blamed on the operator rather than the operation.

#### SUMMARY OF FOLLOW-UP ANALYSIS

If we combine the end results for private and ward cases we find in 72 cases of dysmenorrhea there was improvement in 77.8 per cent, with relief in 61.1 per cent and in 47 cases of sterility there was relief in 23.4 per cent. (See Tables I, C and II, F.) If in addition we include the 8 cases in which the stem was used for symptoms other than dysmenorrhea or sterility but in whom an anteflexion of the uterus or a stenosis of the cervix seemed to contribute to the symptom-complex then there was improvement in 55.9 per cent with relief in 45.7 per cent. (See Table III, B.)

In a paper<sup>1</sup> read before the New York Obstetrical Society in 1913 the author presented the available statistics of the operative results for dysmenorrhea and sterility. To these, others are added and a review of Table IV gives for operations other than insertion of stem a relief of dysmenorrhea in from 60 to 85 per cent with an average of

74.1 per cent and for sterility a relief of from 15 to 42.8 per cent, an average of 28.88 per cent. For insertion of the stem a relief of dysmenorrhea in from 48.38 to 95 per cent, an average of 76.25 per cent and for sterility a relief of from 25 to 73.9 per cent, an average of 44.43 per

TABLE IV  
STATISTICS FROM THE LITERATURE OF THE OPERATIVE RESULTS FOR DYSMENORRHEA AND STERILITY

RESULTS REPORTED BY:	NO. CASES	PER CENT DYSMENORRHEA RELIEVED	PER CENT STERILITY RELIEVED	REMARKS
<i>For D. and C.</i>				
Holden, G. R. <sup>2</sup>	95	60	15	
Rongy <sup>3</sup>	4	?	25	
Norris and Barnard <sup>4</sup>	28	78.5	?	
<i>For Pozzi Operation</i>				
Pozzi <sup>5</sup>	?	75	25	
<i>For Dudley Operation</i>				
Dudley <sup>6</sup>	100	75	42.8	7 cases of prolonged sterility—3 relieved
Wardsworth <sup>7</sup>	37	72.9	?	
Rongy	11	?	27.7	
Goldenberger <sup>8</sup>	9	77.7	33.3	
Brickner <sup>9</sup>	73	64.3	27	<i>For Ward Cases:</i> Dysmenorrhea Relieved 55.1 Sterility Relieved 17.2 <i>For Private Cases:</i> Dysmenorrhea Relieved 84.6 Sterility Relieved 42.1
<i>Combined Operations</i>				
Holden, F. C. <sup>10</sup>	40	85	25	Dudley - Reynolds Operations
Wardsworth	33	78.7	30.7	Dudley Operation and: Anterior Wall 18 Oophorectomy 3 Alexander Oper. 1 Ventral Suspension 1 Appendix and Ovary 1 Myomectomy 1 (13 Sterile—4 Relieved)
Norris and Barnard	40	?	35.7	D. and C. 28 D. and C. and Wylie Stem 9 Dudley and Wylie Stem 4 Dudley 1
Rongy <sup>3</sup>	36	?	30.5	D. and C. 4 Dudley 11 Stems 18 High Amputation of the Cervix 3

TABLE IV—CONT'D

RESULTS REPORTED BY:	NO. CASES	PER CENT DYSMENORRHEA RELIEVED	PER CENT STERILITY RELIEVED	REMARKS
<i>For Intrauterine Stem Pessaries</i>				
Davenport <sup>12</sup>	200	?	25	
Wylie <sup>11</sup>	?	80	?	
Beyea <sup>13</sup>	41	80 to 85	33.3	
Rongy	18	?	33.3	
Norris and Barnard	9	77.7	?	
Dickinson and Smith <sup>15</sup>	16	—	62.5	
Norris <sup>14</sup>	35	?	38.57	
Townsend <sup>16</sup>	80	95	—	
Townsend	23	—	73.9	
Watkins <sup>17</sup>	31	48.38	—	Tents and Stems

cent. Further it is of interest to note that Brickner in his series of Dudley operations obtained, as we did in our series of stems, a higher percentage of relief in the private cases.

While we all recognize the unreliability of statistics, they are not more misleading in one operative procedure than in another and as our end results by comparison with other published results seem to be conservative, it would seem that we are justified in making conclusions from the above study as to the status of the intrauterine stem.

#### CONCLUSIONS

1. The intrauterine stem pessary has a limited field of usefulness in gynecology. It is applicable to 51.7 per cent of patients suffering from either dysmenorrhea, sterility, amenorrhea, antelexion of the uterus, stenosis of the cervix, or congenital malformation of the uterus. As an operative measure, it is applicable to 2.3 per cent of patients treated and 1.3 per cent of operations performed in a gynecological hospital.

2. From its use sequelæ, other than a temporary rise of temperature, occur in from 17.6 per cent to 21.8 per cent of the cases with a permanent morbidity of from 5.8 per cent to 9.8 per cent.

3. As a therapeutic measure for dysmenorrhea there is improvement in 77.8 per cent, with relief in 61.1 per cent and for sterility there is relief in 23.4 per cent.

4. The intrauterine stem pessary gives as good end results as other operative procedures for like indications and from its use there is less primary invalidism and no more liability to sequelæ or morbidity.

5. The intrauterine stem should never be used except in carefully studied and selected cases and then the minimum of sequelæ and morbidity with the maximum of results will be obtained as evidenced by the private cases of our series.



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- <sup>6</sup>Dudley: Principles and Practice of Gynecology, 1908, ed. 5.
- <sup>7</sup>Wardsworth, R. G.: Bulletin Free Hospital for Women, 1904, i, 1-3. Later report, 1911, from Personal Notes of Dr. Wardsworth.
- <sup>8</sup>Goldenberger, M. F.: Internat. Jour. Surg., 1911, xxiv, 234-236.
- <sup>9</sup>Brickner, S. M.: Am. Jour. Obst., 1912, lxv, 111.
- <sup>10</sup>Holden, F. C.: Am. Jour. Obst., 1913, lxviii, 1064.
- <sup>11</sup>Wylie, W. G.: Trans. Am. Gynec. Soc., 1909, p. 372.
- <sup>12</sup>Davenport: Trans. Am. Gynec. Soc., 1909, p. 371.
- <sup>13</sup>Beyea, H. D.: Internat. Clinics, 1907, iv, Series xvii, 182-187.
- <sup>14</sup>Norris, C. C.: Surg., Gynec. & Obst., 1912, xv, 706.
- <sup>15</sup>Dickinson and Smith: Am. Jour. Obst., 1913, lxvii, 668.
- <sup>16</sup>Townsend: Sterility in Women, London, 1919, by Arthur E. Giles, p. 187.
- <sup>17</sup>Watkins, T. J.: Surg., Gynec. & Obst., 1913, xvii, 461.

350 WEST EIGHTY-EIGHTH STREET.

(For discussion, see page 531.)

## Case Reports

### OBSTRUCTION OF THE SUPERIOR MESENTERIC VESSELS FROM BANDS WITH THREATENED GANGRENE OF THE GREATER PART OF THE SMALL INTESTINE. RECOVERY\*

BY JAMES N. WEST, M.D., NEW YORK, N. Y.

THE writer has been unable to find any record of a similar case, although the occurrence of gangrene of a part of the intestine from localized thrombosis of the vasa intestini tenuis has been reported; also cases of gangrene of the small intestine with death, as result of thrombosis of the superior mesenteric vessels. It is possible that some of the cases of gangrene of the intestine from thrombosis of the mesenteric vessels may have been due to a cause similar to that which obstructed the vessels in this instance and, therefore, if operated upon with sufficient promptness, life might have been saved.

The case was as follows: Miss I. G., age twenty, admitted to the Post Graduate hospital at 9 A. M., May 2nd, 1918. Chief symptoms: severe general pain in the abdomen with vomiting. Duration, three days. Family history negative. Heart and lungs negative. Abdomen tender and moderately distended. Blood examination: leucocytes, 15800; polynuclears, 82; lymphocytes, 18. The pain in the abdomen became unbearable and notwithstanding the administration of  $\frac{1}{4}$  grain of morphine half an hour before, the girl was screaming with the distress. She was lying on the side and no coherent answers to questions could be obtained. She was forcibly turned upon her back in order to examine her abdomen. It was tender and moderately distended. On deep pressure a long mass about the size of the wrist could be felt posteriorly to the left of the spinal column. Vaginal examination was unsatisfactory. At this time the pulse was 120, temperature 101.5° F. respiration 24.

At 5:30 the patient was taken to the operating room and a long median incision made. The picture first presented was that of the whole of the small intestine far advanced toward gangrene. Lifting the intestines out of the abdomen, it was seen that a firm band passed from right to left at a point a little above the level of the umbilicus, being attached well over to the left side. It was immediately seen that this band was firmly constricting the superior mesenteric vessels. Below the constriction the mesentery was swollen and showed in its cellular tissues extravasated blood similar to that seen in a twisted pedicle of an ovarian cyst.

The band was the mesentery of a cecum which had revolved toward the left carrying the appendix vermiformis with it. The appendix had become inflamed and attached there. Thus as a result of a hyperdescended cecum with volvulus and an appendicitis occurring on the left side of the abdomen, the mesenteric vessels had undergone a gradual constriction which, probably, became complete about 4 P. M., and which was relieved by operation at 5:30.

*Operation.*—The adhesions of cecum and appendix were freed, the appendix removed, and the cecum revolved into its proper position and fixed there. Almost im-

\*Read at the Thirty-third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20-22, 1920.

mediately upon freeing the mesocecum from over the mesenteric vessels a faint glow of red began to show in the intestines, and before the abdomen was closed this had assumed a deep dark red hue.

In the course of the operation it was observed that there was a double pyosalpinx, the tubes being in a somewhat nodular condition and about the size of the index finger. No attempt was made to remove them as the patient's condition was bad. The abdomen was closed without drainage.

She seemed to rally well after the operation, but at 8 A.M. the next morning the temperature was 100.6° F., pulse 144, respiration 28, and she was vomiting. At 10 A.M., the pulse was 160. She was then infused with 800 c.c. normal saline solution with adrenalin chloride solution. The pulse came down to 140, then to 124 in a few hours. Other stimulation was used from time to time. Flatus and some dark brown slightly bloody feces were passed. She had also vomited repeatedly blood-stained mucous fluid.

On the third day the pulse again went up to 160 and the patient's condition was bad. At this time the abdomen was much distended. She was given stimulants and a milk and molasses enema. This brought away much flatus. On the fourth day vomiting ceased, she retained liquid nourishment, slept some, and her general appearance was better.

From the third day to the fifteenth her temperature ranged daily from 99° to 103°, the curve of the temperature chart resembling that of mild septicemia. From the twentieth day until the day of her discharge the temperature did not go above 101°, but did not really assume the normal type until the thirty-fifth day. On the fourth day a diarrhea set in which became very severe and was only partially controlled by opiates and bismuth.

On the twelfth day an examination of the blood for typhoid, paratyphoid and syphilis was made. All tests were negative. At this time a blood count showed: leucocytes, 36500; polynuclear, total, 94; lymphocytes, total, 6. The urine was negative. The wound healed by first intention. From the twentieth day on the bowels became practically normal, the diarrhea having lasted sixteen days.

Patient was discharged cured on the thirty-ninth day after entering the hospital. She has been seen recently and is well and hearty. The pyosalpinx is causing her no symptoms and her digestive system functionates perfectly. The writer attributes the collapse at the beginning, the diarrhea, the leucocytosis and the septic temperature to autolysis (cell destruction) incident to the threatened gangrene of nearly the whole small intestinal tract.

The superior mesenteric artery supplies the whole length of the small intestine, except the first part of the duodenum. It also supplies the cecum, ascending and transverse colon. It is a vessel of large size arising from the fore part of the aorta about one quarter of an inch below the celiac axis, being covered at this region by the splenic vein and pancreas. Thus the destruction of this vessel or obliteration would result in gangrene of the greater part of the small intestine.

Malpositions of the cecum are of frequent occurrence. In the development of the intestine this is, as it were, the last part which becomes fixed. The abnormal situation, or mobility of the cecum, naturally lends itself to the occurrence of appendicitis in abnormal situations. Therefore, in cases presenting the symptom-complex of appendicitis minus the normal situation, one should bear in mind the possibility of appendicitis in an abnormal situation.

Abnormal situations of the cecum have been found more frequently in children than in adults and are usually labelled as hyperdescent, where the cecum is abnormally low and hypodescent where it is abnormally high in its position. Hyperde-



scent lends itself to volvulus, which has in itself at times demanded operation on account of obstruction.

R. H. Fowler has made a comprehensive study of this subject, but confines his observations chiefly to abbreviated colon and the high situation of the cecum, and makes no mention of movable cecum and appendiceal complications depending upon this mobility.

The chief lesson to be learned from this case is that when, on opening the abdomen, one finds a small intestine in a state approximating gangrene, he should not close it without a careful search for the cause. The search in this case revealed a condition which, relieved, resulted in saving the life of the patient. It also shows the necessity of prompt operation in abdominal conditions presenting sudden and violent symptoms.

The following references, except Gray, contain reports of similar cases.

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71 WEST FORTY-NINTH STREET.

(For discussion, see page 519.)

# Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-THIRD ANNUAL MEETING HELD IN ATLANTIC CITY, N. J., SEPTEMBER 20-22, 1920.

*(Continued from January number.)*

DR. JAMES N. WEST, of New York, N. Y., presented the report of a case of **Obstruction of the Superior Mesenteric Vessels from Bands, with Threatened Gangrene of the Greater Part of the Small Intestine. Recovery.** (For original article see page 516.)

## DISCUSSION

DR. JOSEPH H. BRANHAM, BALTIMORE, MARYLAND.—I would like to ask Dr. West whether there was any intestine caught under this adhesive band or only the blood vessels?

DR. WEST.—Only the blood vessels. The cecum had swung across to the left side of the abdomen, and this was a hyperdescended cecum, so that it had a mesentery, and this mesentery formed a regular arch from the mesenteric vessels, and at the time I got in they were completely obstructed, not the intestine.

DR. GEORGE F. CHANDLER, KINGSTON, NEW YORK.—Recently I had a case very similar to the one reported in which there was a band which extended from the iliopectineal line across to the mesentery of the ileum about six or eight inches from the ileocecal valve. The intestines had become twisted, and there was an area of about twenty inches or more of intestine which was practically gangrenous. The woman was in an extreme condition. The only thing I did was to free the band and make three punctures of the intestines, drain out the contents as best I could, and sew them up. There was fluid in the abdomen, I put in a tube, and trusted to the opium treatment, and I am happy to say that the woman is well.

It was a similar case due to the obstruction of the circulation in the intestine, and without resection she has made a recovery.

It is rather interesting to note that I had previously operated on this woman three times, once for an extrauterine pregnancy, once for a gangrenous appendix, and once for carcinoma of the breast.

DR. WEST (closing the discussion).—The reason I reported this case was that when we opened the abdomen and viewed the intestine, apparently all the small intestine was gangrenous, and I was advised by the house surgeon who was always ready to give advice, to close the woman up and let her alone. That is the way we do when we get cases in which there is gangrene of the small intestine from thrombosis of the superior mesenteric vessels, but I said, we will endeavor to find the cause of this trouble, and that fact saved the woman's life.

DR. HAROLD D. MEEKER, of New York, N. Y., read a paper entitled **Pseudocholecystitis.** (For original article see page 454.)

## DISCUSSION

DR. ROBERT T. MORRIS, NEW YORK CITY.—In 1893 Mr. Lane published a description of his "kink," and I published in the same year a description of what I called "cobwebs in the attic of the abdomen." We both at that time ascribed these to toxic causes. Mr. Lane captured the ear of the profession earlier than I did in presenting his subject, because so many men were at work to find his "kink," and I found it incidentally.

In the great majority of cases there are some adventitious bands that seem unquestionable, but in a large proportion, so far as my observation goes, the cases are toxic in their origin and are due to an elective affinity, I believe, according to Rosenow's theory of toxins. The destruction of tissue, the injury of tissue, is not done so much by enzymes or by bacteria at this point as by antibodies which are called out in response to the presence of toxins brought there by elective affinity. The overaction of the antibodies causes autolysis, loss of plastic exudate, and replacement of plastic exudate with connective tissue. It seems to me, we may look upon the toxic feature as fundamental in most of these cases, and I believe they will respond to treatment aimed at some fundamental focus of infection.

In regard to the treatment, I have followed very closely the method employed by Dr. Meeker, but in some cases, where the raw surface is very large, I have not employed the graft or buried the raw surface, but have used the cergile membrane, or sometimes the aristol film. A good resource is to allow the patient to turn often in bed from one side to the other, shortly after operation. Instruct her to turn once or twice a day, sitting up and lying down in such a way that new plastic exudate after operation is not replaced by connective tissue until endothelium grows across the raw surfaces.

DR. GORDON K. DICKINSON, JERSEY CITY, NEW JERSEY.—Dr. Morris' ideas as to the bands and his operation appeal to me, but from the cases I have seen and studied, I am not convinced they are correct. Abdominal surgeons run across them frequently and find them to be embryonal in character. They are really overgrowths of the greater omentum. They may occur up under the liver or gall bladder, may run up on the hilus or down into the abdominal wall.

DR. WILLIAM SEAMAN BAINBRIDGE, NEW YORK CITY.—Although many of us are interested in and devoting a good deal of time to the study of the causation of these bands, others are curing cases that otherwise would go on suffering for years. Twenty years ago, when we began to talk about kinks, bands, etc., we were laughed at, and were told that there were no such things. Gradually, the profession has come to recognize the existence of these abnormal conditions, and Dr. Meeker has gone a long way towards classifying and bringing them into anatomic relationships. If these bands are present and if they are doing harm, then they should be treated as entities. For fifteen years some of us have been publishing our cases of stasis. As a rule, the results have been most gratifying. We cut transversely and sew up longitudinally, relieve stasis bands and angulation, and thus improve or cure these patients.

I believe it is time for us to realize the importance of these bands and not to ignore their existence, or wait to find their cause before instituting corrective measures based upon mechanical principles.

When we take out the chronic appendix, let us remember the relationship of the right upper to the right lower quadrant, and the possibility of bands elsewhere in the abdomen. A pull on the transverse colon will often demonstrate the presence of such bands as shown by Dr. Meeker. Often the patient must be placed in the anatomic position to discover the bands of attachment of the dependent organs, to the points of fixation above.



DR. GEO. W. KOSMAK, of New York City, read a paper entitled **Splenic Leucemia Associated with Pregnancy.** (For original article see page 485.)

#### DISCUSSION

DR. WILLIAM M. BROWN, ROCHESTER, NEW YORK.—In all of the cases reported by Dr. Kosmak I take it that the life of the child was of very little value, on account of its prematurity. Why delay radiation, because apparently delivery hastened the end or exaggerated the condition? Why not disregard the child *in utero* and get the benefit of the radiation if there is benefit, and take care of the contents of the uterus afterward if you can improve the patient before you empty the uterus?

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—It would seem that if one viewed this disease, according to the fundamentals that underlie malignancy, the condition ought to be improved under pregnant conditions, excepting that there is a greater call upon the blood elements. A parallel between a leucemia and any malignancy of tissue is very close, and many pathologists place the leucemias in the class of malignant disease. You have cells that have deviated from the normal proportions, to each other, cells that have become anaplastic; that are perverted from their normal condition, and there is the same general physiologic effect upon the body as we find in the fixed tissue malignancies. I cannot see why there is any advantage in bringing on a delivery or an abortion. I have no doubt that all of these cases begin before the pregnancy and because during the pregnancy there was a cause for a larger amount of blood, and this being a disease involving fundamentally the hematopoietic organs, the call involved exhaustion of these organs before pregnancy could be completed. As I have said, I cannot possibly see any therapeutic value in terminating the pregnancy.

DR. KOSMAK (closing the discussion).—Answering Dr. Brown, I want to say I have had no personal experience with x-rays in cases of this kind, and as to the time of application, I can only reply that few of these women went to term, or they were not brought under observation until they were almost at term. For lack of time details of previously reported cases were not stated, but they are too insufficient in number to formulate any distinct directions as to the course to be pursued. In both of my cases the condition of the patient was so serious that the induction of abortion did contribute to the well-being of these particular women. There is one case reported of three successive pregnancies where the diagnosis was undoubted, and one pregnancy went to the sixth, another to the seventh, and a third one to the eighth month, but there was only one live child out of the three.

In view of the extreme emaciation and distress that most of these patients develop, I cannot see why we should not give them a chance if we can bring about relief by the induction of abortion or premature labor.

You will note in the summary that many of these women gave birth to macerated fetuses. In view of that fact, we can reduce the element of danger by emptying the uterus. There was no difficulty in doing this in one patient I referred to. In this case we put in a bag and in a few hours she was delivered.

I was much interested in Dr. Davis' remarks about the supposed malignant tendency in these cases of leucemia. That has been mentioned several times and undoubtedly there is a good deal of truth in it. In view of that fact, if we assume this is a malignant disease, we ought to pursue the same course we pursue in any other kind of malignancy during pregnancy, namely, empty the uterus. It seems to me, that is the consensus of opinion. What we do in the

presence of malignancy in other parts of the body, we should do in that of the blood-forming organs.

I desire above all to call attention to the necessity of thoroughly examining all cases of marked anemia associated with pregnancy. We ought to make a careful white cell count and look for any tendency to leucemia, for many writers have noted a prodromal period marked by progressive emaciation, by dyspnea, etc., in addition to the changed blood.

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DR. J. E. LITZENBERG, of Minneapolis, Minn., read a paper on **Missed Abortion**. (For original article see page 475.)

#### DISCUSSION

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—I was particularly interested in hearing what Dr. Litzenberg had to say about the causation of missed abortion because in cases which I have seen, there was some abnormality of the cord.

In the first, which is the most typical case of missed abortion, a woman at full term was delivered of a fetus approximately 16 cm. in length. The uterus in this case had not enlarged since the fourth month of pregnancy, at which time fetal movements were felt for about one month. The cord lesion in this case was a velamentous insertion.

The second case was a pregnancy in which there was no further development after three and one half months, the ovum being expelled six weeks afterwards. In this case the cord was wrapped three times around the neck of the fetus and also had a true knot. The specimen from this case was described by Dr. Fred Taussig.

The third case was remarkable not only on account of the missed abortion, but was also a case of single amnion twin pregnancy with entwining of the umbilical cords. The specimen was expelled from the uterus, apparently the size of a twenty-four weeks' gestation which had not increased in size during the last two months of the pregnancy. No fetal movements had been felt. One fetus was mummified, 17 cm. in length. The other fetus was 10.5 cm. in length and was a monster of the acardiacus acephalous type. These cords were entwined together by many revolutions. There was a true knot in the cord of the larger twin. This specimen was presented by Dr. S. F. Abrams. The placentas in all of these cases microscopically show marked degeneration throughout and a picture similar to that characteristic of white infarct formation.

Another case which might be classified under this group was a pregnancy which went to twenty-eight weeks, after which time fetal movement ceased and the fetal heartbeat could no longer be heard. Four weeks later the fetus was expelled and was macerated. In this instance there was a true knot in the cord.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—Since Fraenkel published a thesis based upon a study of one hundred and five cases of missed abortion, very little has been written on the subject.

Fraenkel's definition of missed abortion as published in 1902 was as follows: A fetus ceasing to grow before viability which was retained in the uterus up to the time when labor was supposed to have taken place. However, since then our conception of the entire subject changed because we are not so fearful of emptying the uterus as they were in those days. There are not so many cases now which are allowed to go on to term. Missed abortion is a very dangerous

condition for the woman as has been shown by the case of Dessikar, when after seven years the fetus perforated the uterus, entered the peritoneal cavity, and the woman died as a result of sepsis.

Personally, I believe that abortion must be divided into three distinct groups. First, the acute variety: A woman who has been pregnant two or three months suddenly gets pain, hemorrhage, and within twenty-four or thirty-six hours the product of conception is expelled. In these cases we find that there is practically very little the matter with the fetus but we do find a clot of blood on the uterine surface of the placenta entirely interrupting the circulation and causing it to become a foreign body and is therefore quickly expelled. Second, the subacute variety: A woman who is pregnant two or three months and stained or spotted for a week or more, at the end of which pain will set in with some hemorrhage and the product of conception is expelled. On examining such products of conception we find that the child has probably been dead for twenty-four or thirty-six hours, that a greater portion of the placental surface is dotted with small hemorrhages and as soon as the largest part of the placental surface is disturbed circulation is interrupted and it naturally becomes a foreign body and the product of conception is expelled. Third, or so-called cases of missed abortion. In these cases we find the condition reversed: A woman has been pregnant for two or three months then some staining or spotting will appear, the uterus ceases to grow, the placental site is not disturbed. Upon examination of the product of conception in these cases we find the fetus shrunk and somewhat decomposed but the placenta is more or less enlarged and is out of proportion to the size of the fetus. Only after complete degeneration of the placental site will the uterus at times expel the product of conception.

My own experience consists of twenty-one cases which I presented to the New York Academy of Medicine last April, since then I have had two more. Hemorrhage was not an important factor in any of the cases, neither was the temperature. On the whole the women seemed to carry the product of conception easily, and were not badly affected by it. The question is what are we to do in cases of missed abortion. Some obstetricians maintain that all such cases should be let alone.

Personally, I believe that when a patient consults a physician and he suspects a missed abortion he ought to keep her under observation and tell her to return for another examination in four weeks and if he finds that the uterus is not enlarged at that time and if she still has signs and symptoms of a retained product of conception, that he should wait four weeks longer in order to make sure of his diagnosis because in many cases the menstrual history does not correspond with the size of the uterus. However, if, after eight weeks' observation he finds that the uterus is not enlarged and has become less soft he ought to interfere. I do not think we ought to wait until the end of the supposed pregnancy before interference is instituted. I think such practice is bad and as a result many women may suffer.

DR. G. VAN AMBER BROWN, DETROIT, MICHIGAN.—I should like to report a case for the purpose of getting it on record. This past spring an internist referred to me a woman with pulmonary tuberculosis. She was sent to me for the purpose of considering the advisability of emptying the uterus. I found she had been pregnant about three months. After further consultation we decided not to empty the uterus. I saw the woman about three months later and was then suspicious of a dead fetus. When she was seven months' pregnant, the uterus upon examination was found to be smaller than when it was first examined. The evening following this examination I was called by the husband



to come and see his wife as she was in labor. I arrived in about thirty minutes and found she had expelled the ovum. The membranes were intact. On opening the membrane it was found to contain a fetus of about thirteen or fifteen weeks. The cord was entwined several times about the neck binding it so tightly that the neck at this point was just about the size of one's little finger. Evidently the death of the fetus had occurred about twelve or fourteen weeks before the expulsion.

DR. LITZENBERG (closing the discussion).—I did not go into the details of etiology because there are so many theories. Dr. Schwarz spoke of lesions of the cord. That is a cause to which our attention has been called by one author. One of my cases was a case of twins. The expulsion of a fetus with another twin does not come within the purview of this paper. Dr. Rongy mentioned Fraenkel's paper in which he collected 105 cases. It was my intention and my hope to make the compilation since that time; I find 52 articles since 1903 on missed abortions, but on account of the conditions of the war I was unable to get anything like a complete collection of the papers themselves. There are to be added to that 75 known cases of articles which I did collect, but inasmuch as the majority of these articles I could not get hold of, I did not go into the question of figures. I have collected 139 articles on the subject to date. Dr. Rongy mentioned a case which came in the skeletization class. If we add to this class the skeletization where the entire fetus, except the bones, disappears, it would make an interesting chapter by itself.

Dr. Rongy spoke of not seeing any hemorrhage. He may never see any, but, on the other hand in the next case, the hemorrhage may be very severe. This has been pointed out by Duncan. Hemorrhage is an inconstant thing, I am sure, but after delivery some of these women bleed profusely.

As for waiting to empty the uterus, I cannot see any logic in waiting for a month, when even in my small series and in the series given in the literature the woman is exposed to temporary invalidism which reduces her to a low state of health. In my case, No. 7, the woman was in perfect health up to the time of the missed abortion and never regained her health. That is probably the reason why tuberculosis was able to fasten itself upon her.

In Rosenstein's and Rosinski's cases there were deaths due to missed abortion. Do not get the idea that emptying the uterus is an urgent thing, and that we must empty the uterus immediately because we have made a diagnosis. It is not so acute that great hurry is necessary but we must not wait too long. The degeneration may involve the uterine wall, and we may get such a hemorrhage as to cause death, as was the case of hyalin degeneration in Rosenstein's cases. Why expose the woman to such danger when we can empty the uterus with greater safety? I said it was well to empty the uterus, but be sure of the diagnosis. See the woman a month between, and if she has not had any untoward symptoms, I would wait two months, as Dr. Rongy does.

I have written this paper as propaganda. I have been asked by many professional friends: "What is missed abortion?" They have never heard of it. I have told them to read what Duncan has said on the subject: "If you do not know about the thing, you are not likely to suspect it, and if you do not suspect it, you will be sure not to find it."

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DR. LEWIS F. SMEAD, of Toledo, Ohio, read a paper entitled **Some Cases of Thrombophlebitis during the Puerperium following Influenza**. (For original article see page 447.)

## DISCUSSION

DR. GORDON K. DICKINSON, JERSEY CITY, NEW JERSEY.—I desire to call attention again to the paper read before this society, a few years ago, by Dr. J. A. Harrar, in which he described a treatment of bacteriemia associated with thrombophlebitis, which consisted of an intravenous injection of a 2 per cent solution of Epsom salts. In a number of cases of streptococcemia in women, I have used this procedure. There were chills and elevation of temperature of several weeks' duration, and a chronicity which gave no evidence of recuperation. The sulphate of magnesium solution would be followed by a severe chill, but the next day the temperature would come down to about normal and stay flat for a day or two, when there would be a repetition. More sulphate of magnesium solution would then be administered. Probably three such doses would be necessary before the condition became satisfactory. I have had one or two cases of staphylococcemia improved by this treatment, but that is not the subject for consideration. Before we resign our cases to surgery, not knowing where to find the vein, or resort to desultory treatment, we should give Dr. Harrar's suggestion a trial.

DR. E. GUSTAV ZINKE, CINCINNATI, OHIO.—This paper contains some surprises. I did not know it was possible for so many veins to be affected as the doctor described, and that they could be cured by operative procedure. The excision of infected veins is not new; but it has been found impossible, if numerous veins are infected, to excise them all; and, if we cannot do this, it is better not to attempt it at all. The majority of cases of thrombophlebitis recover without operation. The infection in thrombophlebitis is always of streptococcal origin. The life of the streptococcus septicus is limited, as demonstrated in cases of erysipelas. The germs enter the veins, destroy the endothelium, and cause hemorrhage. The resulting coagulation forms thrombi, after which the germs usually die. The thrombi are slowly absorbed, the circulation is re-established, and the patient recovers. This is the most frequent termination of thrombophlebitis. It is only when the germs assume a pyogenic character that a suppurative septic phlebitis occurs, and it is then that the process of suppuration is carried into the circulation. The patient dies, usually, of an endocarditis or a general bacteriemia.

So far as operative procedure is concerned, I am surprised at the statements made in the paper, although I have no doubt the writer has good authority for them. But from what I know of thrombophlebitis from personal experience, I have good reasons to doubt the truth of the statement, not as made by the essayist, but by the authors he has quoted.

DR. SMEAD (closing the discussion).—My reason for writing this paper was not only because I had these cases to report, but because of an article which appeared recently in the *Journal of the American Medical Association* by an Australian advocating radical operation in these cases.

I thoroughly agree with the two last speakers that they are not operative cases. None of my cases were operated on except one that had an abscess which had to be drained.

I have gone over the literature carefully, and my paper is a report of the literature as to the advisability of operation. Personally, I believe conservative treatment is best. I should hesitate to go in and ligate these veins with the idea of preventing extension of the infection. However, there are many successful cases on record.

DR. BENJAMIN R. McCLELLAN, of Xenia, Ohio, read a paper on **Dermoid Cysts of the Ovary**. (For original article see page 493.)

DR. GREER BAUGHMAN, of Richmond, Virginia, presented a preliminary report on **Pyelitis in Pregnancy with Illustrative Cases**. (For original article see page 436.)

#### DISCUSSION

DR. JOHN OSBORN POLAK, BROOKLYN, NEW YORK.—The subject Dr. Baughman has brought before us is of great importance because of the frequency of error in diagnosis made between pyelitis and appendicitis. That is one of the most frequent mistakes in cases of acute right-sided pain complicating pregnancy. Those of us who are doing obstetrics know the frequency of pyelitis is so great that it is the first thing we suspect rather than appendicitis, and in the history there is always a subjective picture of bladder disturbance preceding pain and temperature and the other characteristic symptoms.

The treatment the doctor suggested is of considerable interest. For a number of years we had our urologists take care of our kidney cases, but for the last five years we have done our own urological work, and we have had better results in the treatment of our pyelitis cases. There is stasis, and as a result of it a lowered resistance, the migration of bacteria, and infection of the kidney. The infection is not often from the bladder, but is directly, as a rule, from the colon. Usually the bacteria that are found are the colon bacilli. Occasionally we get a mixed infection. A mixed infection with staphylococcus is much more resistant to treatment. The colon cases are readily curable and the only question is whether irrigation or drainage is the most suitable procedure. Our best results have been obtained by the introduction of the ureteral catheter, leaving it in for twelve hours at a time. The objection we have to irrigation is that we have not been able to get our pyelograms any more than the doctor has, showing diminished pelvis, except after continuous drainage, and where we were using irrigation we were getting the pictures the doctor has shown on the screen, namely, dilated pelvis. A pyelogram is important. If you take a pyelogram in several postures it shows whether there is a kink in the ureter, and the picture indicates the direction of natural drainage. Some of these cases need the Trendelenburg position; others need the Fowler position.

One point I would like to ask the essayist about is whether he has been able in all these cases to follow them up and find whether there has been absence of bacteria. The bacteria in some of our cases have persisted after a clinical cure; that is, we have continuously found bacteria in the urine, particularly so in cases of mixed infection. The patient runs no temperature; the kidney function is all right; but every once in a while the patient has a little disturbance of urination. We do not find pus, but we do not find on culture bacteria in the urine.

DR. HENRY D. FURNISS, NEW YORK CITY.—The title "pyelitis of pregnancy" is a misnomer, for the disease exists just as often in the absence of pregnancy. As the obstetrician sees pyelitis only as a complication of pregnancy he is apt to think of the condition only as pyelitis of pregnancy. Most of the cases of pyelitis seen by the gynecologist are independent of pregnancy.

At the Sloane Maternity Hospital in doing phthalein estimations on pregnant women, it was found in catheterizing them after voiding there was often resid-



ual urine in the bladder, which is more important than pressure on the ureter itself as a cause of urinary tract infection.

Dr. Polak and Dr. Baughman spoke of kinking of the ureters. I think that an inflammatory process is secondary and is a result of the condition and not the cause of it. You see it in all these pyelograms that have been shown here. The pelvic dilatation is, according to Braasch's classification, of the inflammatory type and not the distinctly mechanical.

The interruption of pregnancy I believe is not a good procedure because it does not cure the patient, as a rule. It may help, but it does not cure.

Early local treatment of these cases, whether in the pregnant or the postoperative, or any other type should be done. If it is performed carefully there is practically no more discomfort than from catheterization of the bladder, especially if one uses a small single barrel catheteroscope. It is unnecessary to use a large catheter to force the obstruction. I think when you get rid of the obstruction, nitrate of silver is the best thing to use. Irrigate first with boric acid to clear away all urine, so that the silver will not be precipitated by the chlorides. I believe that nitrate of silver does not act as an antiseptic but as an astringent, producing shrinking of the mucous membrane and establishing better drainage. If you examine the bladder you will observe that portion around the ureter intensely congested. There is the same process in the ureter, the swollen mucosa narrows the lumen and interferes with drainage. The astringent action of the silver causes this to shrink and improve drainage. I saw a patient who developed cystitis and kidney infection after a severe labor. Unfortunately that patient was operated on and one kidney removed. The cystoscopic picture showed an intense bullous edema located over the trigonum. Section of the kidney and ureter showed an extension of the trigonal condition of the ureter into the pelvis for one-quarter of an inch up, where it was distinctly limited. In that case the retention and faulty drainage were due to the swelling of the ureteral mucosa. I do not believe in these cases we can judge too much by the size or retention of the pelvis of the progress of the patient. These cases are slow to return to normal. You must consider the general condition of the patient and whether or not you are getting amelioration of your symptoms. Treatment should be done energetically, and I do not see any necessity in these cases for waiting two weeks, except that it is more difficult to catheterize the bladder in the first few days postpartum.

DR. K. ISADORE SANES, PITTSBURGH, PENNSYLVANIA.—I would like to ask Dr. Baughman (1) whether all these cases showed ureteral kinks with dilated pelves, (2) whether the patients might not have had dilated pelves with ureteral kinks complicated by pregnancy, rather than pregnancy complicated by pyelitis, ureteral kinks and dilated pelves.

The pyelitis pictures, like the ones shown by the essayist, we frequently see, as Dr. Furniss remarked, in gynecologic work. If such a pyelitis patient gets pregnant, the obstetrician may attribute the pyelitis to the pregnancy. Pyelitis, however, may also occur as a complication of pregnancy. Whether preceding pregnancy or developing during it, pyelitis frequently gives rise to serious disturbances and requires treatment. All of us have frequently observed the fall of temperature and the disappearance of pyuria after the first renal catheterization. It is a question, therefore, whether renal lavage is necessary. In our practice we do not subject our patients to renal lavage unless we are satisfied that catheterization of the kidney alone cannot give relief.

DR. BAUGHMAN (closing).—In regard to Dr. Polak's point, I can only say that we very seldom get rid of the bacteria. The patients feel well, and they therefore do not come back very often for treatment or for observation. We find bacteria in these cases persisting for months and months.

In regard to the substances with which the kidney pelvis should be irrigated, I think silver nitrate is distinctly the best. We have had some good results with mercurochrome. In one of these cases, following a severe reaction with silver nitrate, we tried mercurochrome, and it was very satisfactory.

In regard to the point as to whether these cases have a kink beforehand or whether it is the result of pregnancy, I have no way of saying. They may have been potential pyelitis cases before pregnancy, but we did not learn about pyelitis until after they were pregnant.

In regard to drainage, I had to make my remarks so brief that I was not able to say what I would like to say. Our idea in regard to the treatment of these cases in that drainage is the important thing. We use hexamethylenamine water to increase drainage, also drain with the catheter, leaving it in place where there is an indication. I want to emphasize the point brought out by Dr. Polak that you cannot always get drainage simply by having patients in the Fowler position. We turn them in bed in every possible manner, and know they are draining when they say that they feel much better.

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DR. WM. SEAMAN BAINBRIDGE, of New York City, read a paper entitled **Benign Mammary Tumors and Intestinal Toxemia.** (For original article see page 465.)

#### DISCUSSION

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—This paper brings before us a principle that can be applied not only in benign tumors but also in malignant growths. I do not think Dr. Bainbridge has emphasized malignant changes so much as the benign. The changes in tissue fundamentally must fall back upon change of metabolism. In the entire process of metabolism one has to bear in mind the following steps: First of all, there is the preparation of the food which has an influence upon the psychic stimulation of secretions. Next, a mechanical division of the food, then the digestion, and what other changes there are in bringing the food to what we call proximate principles. When in the form of proximate principles it is before the epithelium of the intestinal tract and ready to commence with the metabolic processes proper. Anabolism proceeds in building the tissue and catabolism separates the products that are left over. In order to have a tissue perfectly formed, there must be a correct anabolism. To maintain healthy tissue we must have correct catabolism. In the conditions which Dr. Bainbridge has so forcibly pictured, all of these conditions are interfered with, and the tissues cannot be properly made into their normal structures, neither can they be maintained in health. Therefore not only in dealing with the benign growths, but also with malignant growths, it is very well to bear in mind that we must look well to the entire process of metabolism, so that there are no interfering factors. It is a well-known fact that a considerable number of malignant growths that have been definitely proved as such have been cured without any artificial interference. The body has been able to cure these absolutely by metabolic means.

DR. FRANCIS REDER, ST. LOUIS, MISSOURI.—It has occurred to me in listening to Dr. Bainbridge's paper, whether these conditions of intestinal toxemia are centered clinically from the very first upon the breast, or whether these clinical manifestations merely direct attention to the abdominal viscera. A thorough examination of the abdominal organs, especially those in the pelvis, should be made, before a definite expression is ventured on the breast condition. I am inclined to think that a breast pain in connection with intestinal toxemia can be readily recognized as to its pathology clinically and should, therefore, receive only secondary consideration. However, there are many physicians who get overanxious whenever a woman complains of pain in her breast and are inclined to overlook conditions elsewhere and center their attention solely on the breast. I may cite one instance in which the pain in the left breast became so pronounced that a doctor deemed it wise to have the breast amputated. No distinct mass or lump could be felt, the breast, however, was removed on account of pain. A similarly painful state manifested itself in the right breast. I was called in consultation, and in making an examination of the woman, an ovarian cyst, right sided, was discovered. With the removal of the cyst, and it took considerable persuasion to get the consent of the patient for operation, the pain in the right breast disappeared.

I have since had five or six cases of pelvic tumor with associated breast pains that went unrecognized, where the breasts came very near being sacrificed.

DR. CRILE.—How do you deal surgically with stasis?

DR. BAINBRIDGE.—I consider the gastrointestinal tract as a hollow tube, and wherever there is a kinking or twisting which is abnormal in nature, causing definite symptoms that cannot be relieved by medical, mechanical, dietetic, physiologic, therapeutic or any other means, after due consideration, I open the abdomen and make a careful survey, and where the bands are causing definite obstruction and preventing natural drainage, I correct the conditions. I have preached that for a long time. Take the proposition as you have it. Is that tube functioning? Does the alimentary canal act sufficiently proper as a human plumbing plant? If it does not, we want to correct it in one way or another. I believe in a fair trial of a reasonable amount of conservatism before radical intervention; and with surgical intervention we do not rely strictly on finger-tip work in a small abdominal area, but observe the whole field carefully and then do whatever seems best in the judgment of the operator.

We must remember that there may be definite kinks without any stasis, and there may be stasis without kinks. By stasis we mean that the passage of food along the alimentary canal takes place with such slowness that there is formed an excess of toxic matter, especially in the small intestine. Consequently, the blood flow pours into the transforming and excretory organs a quantity of poison larger than they can eliminate. From this it follows that all the tissues of the body, drenched in this blood rich in poisons, degenerate and offer a diminished resistance to infection. A defective drainage has consequences which are deleterious to the organism in general as well as to the individual tissues of which it is composed.

DR. VAN SWERINGEN.—How would you deal with cases of diverticulum of the cecum?

DR. BAINBRIDGE.—Some years ago, in the Naval Medical Bulletin, Vol. 9, No. 2, I described the technic of that operation. Plication and careful anchoring of the cecum, in most cases of moderate diverticulum, seem to give sufficient



correction. If there is a retrocecal diverticulum, the method as described by Dr. Meeker in our Transactions several years ago, has proved of value. In cases where the cecum and ascending colon are very much dilated, and there are a considerable number of diverticuli with a mobile cecum, the method employed by Waugh, recently described in the *British Journal of Surgery* has been found useful. In very extreme cases where the muscular wall has been entirely atrophied, and the wall of the cecum is almost like tissue paper, excision of the cecum may be indicated.

I wish to thank Dr. Davis for his interesting pathologic viewpoint. We all know that malignant growths have disappeared, but the possible relationship with toxemia is most interesting.

I also extend my thanks to Dr. Reder. I have a paper ready for publication describing breast conditions which cleared up after pelvic toxic complications were relieved.

In closing, I wish to say that I am fully aware of the danger in all this teaching. On the floor of this Association last year, one man made this statement, in a discussion: "Wherever there is an appreciable lump in the breast, that breast should either be removed within forty-eight hours or a section of the tumor removed and examined microscopically." We believe thoroughly in a campaign of education; we want the laity to come early for examination. Such an unqualified statement coming from our Association is most dangerous. Patients have a right to expect from us a well poised judgment, careful and expert diagnosis, based on all the facts. We all realize the tragedy of permitting a patient to drift beyond the hope of surgical cure; but it is also a dire calamity to unnecessarily remove a woman's breast, which often brings to her a life of sorrow, as well as disturbs the cycle of the secretory system.

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## THE NEW YORK OBSTETRICAL SOCIETY. MEETING OF NOVEMBER 9, 1920.

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THE PRESIDENT, DR. FRANK R. OASTLER, IN THE CHAIR.

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DR. HERMANN GRAD presented a **Report of a New Method of Shortening the Round Ligaments of the Uterus with End Results in 100 Cases.** (For original article, see page 411.)

### DISCUSSION

DR. S. A. CHALFANT, OF PITTSBURGH.—Some years ago I looked up the question of the shortening of the round ligaments and found that more than the "fifty-seven varieties" had been proposed. There seemed to be almost an infinite number of methods of shortening the ligaments with a very minimum of difference in a great many of them. That presented by Dr. Grad has, I think, a decided advantage in that the ligament is shortened in its natural course. The amount of traumatism and the consequent postoperative adhesion is a possibility that one would have to consider. To one undertaking this operation for the first time it would be rather troublesome, but after a little experience it can probably be done with a minimum amount of traumatism. The danger of postoperative complications is always to be considered in the technic of any procedure.

DR. LEROY BROWN.—The reason I do not follow Dr. Grad's procedure is that in my experience the patients complain afterwards of backache, which I attributed as possibly due to my overshortening of the uterosacral ligaments, and I would like to ask for the experience of Dr. Grad and Dr. Young, who have done many of these operations, on this point.

Concerning Dr. Grad's additional suture or temporary suspension, I would like to ask him whether he has found any cases in which he felt afterwards that there was a deviation or unintentional fixation of the fundus to the abdominal wall.

DR. ALBERT M. JUDD.—I have had considerable experience with round ligament operations. I have run the gamut from the Wiley and the Mann to the Baldy-Webster and all the other named and nameless operations on the round ligaments, and at the present time I have settled down on two types. One is the Alexander, which I might place under two headings, one the straight Alexander and the other the Alexander with a Pfannenstiel skin incision and the horizontal fascial incision, as formerly done by Barrows, to finish up the pelvic work. The other type of operation of which I personally approve is the Montgomery operation. I have absolutely avoided in all my work any operation upon the round ligaments whereby there are any unnatural lines or holding points made within the peritoneal cavity. I have abandoned the Webster-Baldy and have abandoned the Gilliam. The two types of operation I am doing now are giving me excellent satisfaction.

I think, as does Dr. Chalfant, that Dr. Grad's operation, after it has been done some time by an individual, would give perfect satisfaction from the standpoint of very little traumatism and no new ligamentous adhesions between the peritoneal surfaces.

DR. HERMANN GRAD.—I would like to say, in response to Dr. Chalfant that there is very little traumatism in this operation, and that is one of the distinctive features of this particular method of shortening the round ligaments. I find that in the cases done by this method (and I have had several hundred of them) there have been no complications as the result of the operation. I have had the opportunity of re-opening the abdomen in four instances and it was surprising to see how the round ligament that was tucked into the broad ligament, had shriveled up.

In answer to Dr. Brown as to whether a suspension band develops after this method of suspension, I can say that no such band develops in these cases. In regard to the uterosacral ligaments I can say that in the follow-up at the Woman's Hospital I have paid particular attention to any tenderness in the uterosacral ligaments and find that they are perfectly normal in every way.

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DR. REGINALD M. RAWLS read a paper entitled **The Status of Intrauterine Stem Pessary Based on a Study of 205 Cases with End Results in 117 Cases.** (For original article, see p. 499.)

#### DISCUSSION

DR. S. A. CHALFANT.—Dr. Rawls' paper brings out very definitely the indications, as well as the contraindications, for the operation. The contraindications are quite as important ordinarily as the indications.

There is no question but that the stem pessary can do great damage, if it is used in cases which are not suitable for it, cases with pelvic inflammatory conditions. The relief from a most distressing symptom is apparently gained with a minimum of operative risk in the properly-selected cases.

DR. L. GRANT BALDWIN.—It is very interesting to have these statistics for comparison with the published statistics of other operations. First of all, it is evi-

dent that the condition of the cervix after the stem operation is one of less mutilation than the Dudley operation, or any of the other cutting operations on the cervix. I believe the cervix should not be mutilated. I think in all this work the difference between a partially introduced intrauterine stem and a real uterine stem should be considered. In other words, any stem that projects into the vagina will give very different statistics than the one which is kept well within the cervix. In other words, the intrauterine stem, in my experience, is the one which gives better results than that which projects into the vagina. It would also round out Dr. Rawls' paper could we have known the condition of the males in these cases that were not successful from the standpoint of sterility. My practice is not to submit any woman to any kind of an operation for sterility (unless she needs some other surgery) unless her partner has been proved virile. If she has dysmenorrhea and other reasons for the operation, that is, of course, another question. Then there is a justification.

I believe that possibly his statistics in his sterility column might be better if the males had been proved able to do their part. I think as this subject has been worked we find more and more sterility in men. The women come to you and say, "Oh, yes, the husband is 'fine;' he is all right." Now, that does not prove anything. To them it does, and the men hide behind that and refuse to submit to an examination, which is certainly very important.

In regard to the matter of hemorrhage and irregularities of menstruation following the use of the stem operation, I would say that most of my observations along that line are, that for the first two or three periods, in the first one, perhaps the second, maybe the third, following the removal of the stem, there is an exaggerated flow. I have never seen pain with the stem in place. That is one thing I have always been able to promise the patients: "You will have at least one period if you never had one before without pain!" I put the stem in before the menstrual period and leave it in over two or three periods. The solid glass stem, curious to say, seems to drain better than any of the fenestrated type.

I have never gone over my statistics, but I am sure the morbidity has been very, very slight.

If we put stems in cases of salpingitis and infected cervixes we are going to have some trouble. I do not see any more reason why the clamor should be against the stem pessary under such conditions than in cases where we put a hard rubber Smith pessary in a woman with retroversion and it sets up an inflammation and causes an adherent retroversion.

DR. ROBERT L. DICKINSON.—There are stems and stems. There are proper cases and improper cases. Metritis, salpingitis and lurking gonorrheal infections preclude their use, or may be the causes, if stems are used, of peritonitis. We began our experience with a very large, clumsy instrument. We got down to smaller and simpler types.

The point Dr. Baldwin made is a very valuable one, namely, that the stem sticking out of the uterus is particularly liable to carry something into the uterus and keep the cervix patent. This is not the case with the Baldwin stem, as this stem may be left for a long while in the uterus. All types tend to work out. Silver wires, even the thickest like No. 20, or even four wires, gradually cut through. Healing has always occurred behind the wire, so slow is the cutting-out process. This stem is so relatively short, that it cannot do what the Wiley and the Davenport do, retrovert the uterus. The "colic" of a stem is due to the fact that too long a stem is inserted which touches the fundus, or too short a stem over which the uterus buckles and bends.

There are stems and stems. We have a doctor in Brooklyn who, to prevent con-



ception, puts in a thing which is shaped like a lyre, almost as thin as the antennae of a butterfly, that spreads out in the upper part of the uterus. I have taken out several, one that had been there untended and unwatched for a period of seven years after it had been placed, one for five years and others of shorter duration. The tendency is to cut into the uterine wall, but they are so light and so small that they lie there harmless and usually produce the effect desired. Sometimes you take them out of a pregnant woman. I believe that ultimately what might be our standard contraceptive measure, will be some small spread-top stem that shall be tolerated in the uterus. The Outerbridge is in this class—not a stem, but a wire spring of paired parallels. This can be used in the office. It can be used to bring on a single menstruation in a non-pregnant woman, who ceases menstruation, or is not taking up her postdelivery menstruation, and is therefore of very definite value to check premature menopause. It can be placed in any uterus into which a uterine sound will pass and cause no acute pain. It remains in for three or four days, or until a period is established, when the patient can pull it out with the attached string. If it should produce cramp, she can withdraw it at any time. Left in longer, as Outerbridge suggests, it cuts into the lateral wall. I have used it over fifty times. The Chambers stem is made of two half bulbs on stalks springing open in the cavity of the body of the uterus, with a disk in the vagina. It has occasionally done well. The Wiley is brutally big. I gave it up after trying it out. It has a gutter that clogs at times. All stem case-reports should indicate the type of stem used. The Baldwin stem is the one that I have used where operation was needed. Dr. Sidney Smith and myself reported 48 private cases and a much larger number of hospital cases in which this stem was used. The stem operation should not be combined with other operations.

The office use of the stem has not been mentioned. A light silver stem with little wire prongs on it, can be placed for dysmenorrhea or sterility and help a not inconsiderable number of cases. All of the cases that will submit in the office to coacination and dilatation without undue distress can get an effect from the office stem. This, while nothing like as complete as the hospital use of larger glass stems, following dilatation under ether, is at least sufficient relief for the patient to come back and beg for it again. She wears it two or three months, is relieved of the dysmenorrhea and comes back in six months or a year, asking to have it put back. As to tolerance, I have a patient who has constantly worn such a silver stem eleven years. She is examined every two or three months for the indications of premature menopause. She came with ovaries that could not be felt, with a uterus, the cavity of which was one inch long. An Outerbridge stem was put in and she menstruated. This stem was gradually increased in size until the cavity was two and one-half inches. It cured her sterility and her ovaries got large. She is happy as long as she menstruates. If you want to prolong the menstrual life, you can do it that way, mostly, perhaps, for the psychic effect.

DR. LEROY BROWN.—In reference to the Baldwin stem, I would like to say that it has been my aim to introduce it inside of the uterus, but with just the end of the stem showing at the external os, not projecting, but just showing, and held with two wires. It has usually acted well. Dr. Dickinson inserts it higher, so there is a possibility of a bending of the anterior lip surface.

I would like to ask Dr. Dickinson whether, with the silver stem he uses with the projecting wire prongs, it is not his experience at times, as it was ours, that the wire stems (which we stopped using long ago), set up an endocervicitis.

DR. ROBERT L. DICKINSON.—They are silver, so they keep up an antiseptic action. I have had 42 long time office stem cases without any accident, exclusive

of the temporary cases, such as those for which Outerbridge or Chambers springs were used.

DR. WILLIAM M. FORD.—Since Dr. Dickinson suggested the use of an “office stem,” I would like to ask him how long that remains in if it is not disturbed, by reason of the patient pulling it out before it comes out spontaneously. It seems it is a matter of no little difficulty to retain the glass pessaries in place even with sutures. I have had them come out in a short space of time. To overcome the tendency to displacement with the Davenport pessary I have made it almost a universal practice of late years to introduce in addition to that the ordinary Smith pessary to help keep the stem pessary in position.

DR. L. GRANT BALDWIN.—I leave the stem so the index finger can come in contact with it. I fasten it with a little shirt button and find that works very well with two silk-worm sutures, putting the sutures through the cervix, probably one-sixteenth of an inch apart. One word more:—I believe that the cutting out of the stems is due to insufficient dilatation at the time they are put in. If the cervix is over-dilated I do not believe that they will come out. Where you have pain, or severe uterine colic in the first twenty-four hours, it is, I believe, due to imperfect dilatation.

DR. ROBERT L. DICKINSON.—In answer to Dr. Ford, I would say that one must have considerable experience to know in what cases the stem will hold. Of course, given a wide cervical canal, the prongs that stick out on the side cannot get hold. It has to be a relatively narrow canal. It is not always easy to make it hold. There is failure more often than success even with considerable experience. That is why I think some time we will devise a stem that can be spread out at the top. I have spent much time in trying out my invention to get a stem with wings that open up inside of the uterus. No complicated mechanism is permissible as it would collect mucus and menstrual blood which would be retained and decompose.

# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### Nitrous Oxide-Oxygen Analgesia and Anesthesia in Normal Labor and Operative Obstetrics

BY HUGO EHRENFEST, M.D., ST. LOUIS, MO.

Under this title the National Anesthesia Research Society has published a monograph "for the benefit of all those concerned in safer and more efficient obstetrics and anesthesia."\* It represents a systematically arranged review of the literature dealing directly or indirectly with this subject. In view of the evident interest both of the profession and of the laity in the problem of pain relief during labor, the salient points brought out in this analytical study deserve a wider publicity among obstetricians. It will be necessary, however, to state that this review somewhat one-sidedly is limited to a consideration of contributions which in general favor the use of nitrous oxide-oxygen gases in obstetric practice.

#### HISTORICAL EVOLUTION

Nitrous oxide was first recommended for use in obstetric work by Paul Bert in 1878. Following this suggestion, Klikowitsch of Petrograd in 1880, was able to report satisfactory results obtained in 25 cases. Next came the reports of Tittle (1883), Doederlein (1886), and Hillischer (1887). Clifton Edgar of New York, in his English edition of Winkel's Text Book of Midwifery, brought this matter to the attention of American obstetricians and anesthetists. The undeniable lack of interest of the obstetricians in this new method of pain relief, in the opinion of Guedel<sup>1</sup> was due to the fact that while these earlier investigators do not specifically mention *analgesia*, they probably were working either under an imperfect *analgesia* or a light *anesthesia*, not recognizing the essential difference between these two states. C. Henry Davis, of Milwaukee,<sup>2</sup> suggests that owing to its cost, the impurity of the gas secured, the crudeness of the apparatus used, and the fact that the nitrous oxide was often given to the stage of asphyxia, it was not surprising that this method of narcosis did not come into routine use at that time. The efforts of the pioneers came to naught.

The resumption of the use of nitrous oxide in obstetrics followed closely the perfecting of the technic of and apparatus for nitrous oxide-oxygen *analgesia* and *anesthesia* in dentistry and surgery. In 1909, Davis administered these gases for J. Clarence Webster during an abdominal Cesarean section. In this same year Davis wrote: "We gave this anesthetic for all types of operative obstetrics, and in one primipara gave the gas for about two hours prior to a forceps delivery." In 1910

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\*Copies can be obtained from the Executive Secretary, 16 East Broad St., Columbus, Ohio.



Guedel<sup>1</sup> began the routine administration of nitrous oxide analgesia and anesthesia, as we now understand it, in normal labor and operative obstetrics. Since this time the method has come into vogue, and in 1917 R. Ferguson<sup>3</sup> summarized the conflicting opinions and results of many users from their accumulated experiences in some 8000 administrations.

#### GENERAL CONSIDERATIONS

"Any single anesthetic agent," says Guedel, "which will prove universally satisfactory in all cases of obstetrics probably will never be found. The necessary qualifications of such an agent are many. It should have no ill effect, immediate or remote, on either the mother or the baby. It should render true, physical relief from suffering and should be applicable over a long period of time without any influence upon uterine contractions. It must present to the obstetrician a patient in a satisfactory condition for delivery, and, to be entirely practical, it must admit of convenient, simple and economical use. Of all the various anesthetic agents now at our command, nitrous oxide is probably the most physiopathology and the method of its proper administration.

It seems necessary to emphasize that the obstetrician who employs this newer method of pain relief will do himself, his patient and the method full justice only after he has thoroughly familiarized himself with its physiopathology and the method of its proper administration.

Outstanding advantages of this anesthesia are the following: Of all the anesthetics in common use, nitrous oxide is the least harmful in its immediate effects on metabolism. Recovery, after its administration, is decidedly prompt. It is rapidly eliminated from the system. Its different planes from mere *analgesia* to deep *anesthesia* are far more accurately controllable than with any other known form of narcosis. Either stage can be prolonged indefinitely or readily transformed into the other.

McKesson<sup>4</sup> considers nitrous oxide the ideal agent for relief of labor pain, because it is inhaled like air, is practically odorless, almost instantaneous in its action, and is eliminated so quickly that the gas has left the body by the time the next pain is due. The flexibility of this analgesia distinguishes it from twilight sleep or any other form of hypodermic alkaloid amnesia. Nitrous oxide acts so quickly because it is held in the body in an aqueous solution. It follows the natural course of gaseous exchange in the body, while ether and chloroform to become effective must first saturate, to a certain extent, the fats of the body. The lipid affinity of these anesthetics prevents or delays their elimination for hours or even days.

When lipid-solvent agents are inhaled in sufficient concentration to really relieve suffering, their paralytic action on muscles generally weakens uterine contractions and retards their onset. Nitrous oxide actually stimulates uterine contractions.

From a thorough experimental study of "The Relative Toxicity and Efficiency of Chloroform, Ether, and Nitrous Oxide-Oxygen Analgesia and Anesthesia in Pregnancy and Labor" Davis<sup>2</sup> concludes: The administration of either of the three agents, if given for a long period of time and repeated on successive days, causes degenerative changes in tissues, especially of the liver. Those following chloroform are the most severe. With ether and nitrous oxide the changes are chiefly those of cell asphyxiation. Very different and more permanent is the cell necrosis after chloroform. The long-continued use of any of the three anesthetics must be considered dangerous to the fetus. The continuous nitrous oxide

*analgesia* while less harmful than the anesthesia should not be administered for long periods. However, there is no reason for believing that the intermittent use of from four to six inhalations of nitrous oxide-oxygen at the beginning of each uterine contraction can be of any material danger to the fetus. If an anesthesia is required for an operation on the pregnant woman, ether would seem preferable in the interest of the fetus.

Davis' views in this latter respect, based on experimental studies, seem at variance with the opinion of some expert anesthetists. Additional observations and investigations will have to be made to determine the optimum of oxygen admixture. In all events, whether nitrous oxide or ether is used for operations during pregnancy or obstetric operations, it will be the part of discretion to employ a higher percentage of oxygenation to preclude dangerous asphyxiation of the fetus.

Extensive experience during the war apparently proved that nitrous oxide-oxygen is particularly valuable when operating on patients in shock, and is less likely to increase acidosis or shock than ether. The conclusion, therefore, is permissible that nitrous oxide-oxygen should be given preference for women during pregnancy or in labor, who show symptoms of shock or acidosis, or are exsanguinated.

Pregnant women often present many phases of disturbance of blood pressure and of the circulatory system. According to McKesson<sup>4</sup> the common claim that nitrous oxide-oxygen raises the blood pressure is erroneous and, at least clinically, not true. "These gases may be administered for two hours without a material change in either the systolic or diastolic pressure. There is a time limit beyond which the blood pressure will progressively fall even under nitrous oxide, but differing from ether, in the case of the gases this fall is stopped immediately upon removing the anesthetic and is followed by a comparatively rapid rise, approaching normal pressure in a few minutes."

#### OBSTETRIC ANALGESIA

The particular problem of the obstetrician has been to find a method of relief that meets the specific requirements of normal labor and operative obstetrics. In the former, *analgesia* must provide for the intermittent pain and the pain-free interval; normal breathing, the physical relief of pain without eliminating the patient's reasonable and conscious cooperation, making it unnecessary to have a corps of trained assistants and specially prepared rooms. It must be a method that can be used safely and successfully by the physician alone when necessary, or with inexpert help in emergencies. On the other hand, in the case of operative obstetrics, the matter of *anesthesia* must be safe for mother and child, irrespective of the hazard of the case and the operative procedure required.

Nitrous oxide-oxygen analgesia and anesthesia, in the opinion of many writers, meets all these requirements in practically an ideal manner. The present vogue of nitrous oxide in obstetrics, according to Turner,<sup>5</sup> in a great measure is due to a shorter second stage of labor that is practically painless; a complete relaxation of the soft parts which minimizes the danger of tears; a total absence of restlessness and rigidity; the absence of exhaustion; the rapid return to normal after analgesia and to better babies. Any unhappy end results are usually the fault of unskilled use.

The state of *analgesia* is made possible by the fact that in the development of the general *anesthesia* with nitrous oxide the first special sense

to surrender is the sense of pain, leaving the other special senses less influenced. Impairment of the sense of direction or location is a reliable sign of the onset of analgesia. Thus in the self-administration method (developed by Guedel<sup>1</sup>) the hand of the parturient woman holding the inhaler will falter in keeping it in place. The eye, however, is considered a more accurate indicator of the depth of analgesia. Normally, in the state of analgesia, the eyelids should wink lazily and vision should be slightly blurred. This blurring has been utilized by Lynch<sup>6</sup> and other obstetricians as a guide to the patient for the purpose. As analgesia deepens, the eyeball will rotate from side to side. Pain then will be noted in a slight twinge of the eye more quickly than by any other sign. With an overdose in intermittent analgesia the winking becomes sluggish or the lids remain closed. The fearful, neurotic or hysterical patient cannot be handled under *intermittent* analgesia. *Continuous* analgesia must be administered to them, and some can be handled only under anesthesia. Hilarity on the one hand and excitement or lapsing consciousness on the other indicate the extremes of analgesia.

In its last analysis the technic of nitrous oxide analgesia consists in diluting the gas with enough air or oxygen to prevent the loss of consciousness and yet securing enough nitrous oxide saturation for the relief of pain.

According to Davis<sup>2</sup> the following details are essential for the successful administration of the nitrous oxide-oxygen analgesia: (a) The patient should be assured that when the pains become severe they can be relieved. This tends to remove fear and lessens the possibilities of excitement or hysteria. (b) When beginning the administration of the gas, give enough to cause a deep analgesia or even a light anesthesia. This gives the patient confidence in its ability to relieve pain. (c) Determine the number of inhalations necessary to relieve pain, and increase by one or more as the uterine contractions become more severe. (d) The patient must breathe the gas mixture with the first suggestion of an approaching contraction, ascertained by palpation, because she must have reached the state of analgesia before the height of the contraction. Otherwise she is carried through the contraction without amnesia and in many instances with the memory of the pain highly intensified. Obstetric analgesia, therefore, can be successfully administered only by understanding both the obstetric and anesthetic problems involved. This is the reason why trained anesthetists so often fail through ignorance of the mechanism of labor. (e) A complete anesthesia or a continuous analgesia may be necessary for a few minutes, but should be discontinued as soon as the acute pain has been controlled.

With a cooperating patient the method of self-administration may be safely and efficiently utilized towards the close of the first stage of labor and almost entirely throughout the second stage.

It should be remembered that under analgesia the progress of labor cannot be judged by the patient's action or complaints, and consequently, occasional rectal examinations should be made.

The number of inhalations taken at the beginning of each pain determines the depth of analgesia, while the amount of air admixture regulates the speed of analgesia. It develops in the shortest time when pure nitrous oxide is inhaled and is progressively slower with increasing dilution.

At the last pain of the second stage it is common practice to induce *anesthesia*, especially if there is any danger of laceration. This may be accomplished by holding the mask until 12 or 20 breaths of the gas mix-



ture are taken and then delivering while the patient sleeps for 40 or 50 seconds. McKesson adds: The moment the presenting part is delivered, administer 10 or 20 breaths of pure oxygen, or at least a mixture of 50 per cent oxygen, while the umbilical cord still pulsates. Intermittent *anesthesia* during the course of labor might be mentioned only to be condemned.

Some obstetricians advocate the use of the nasal inhaler, others a face mask, while some utilize the one or the other according to the type and state of analgesia or anesthesia desired. Allen<sup>7</sup> prefers the use of the nasal inhaler in the absence of nasal obstruction, because patients have less fear, do not suffer from a sense of suffocation, and feel able to talk.

#### OBSTETRIC ANESTHESIA

In its last analysis successful nitrous oxide-oxygen anesthesia required for some of the obstetric operations, depends on the administration of such a proportionate mixture of the gases as will effect complete anesthesia to a surgical degree and sufficient relaxation, without untoward effect on mother and especially fetus or newborn child. The requirements must be met by adjusting the anesthesia to the reactions of pulse and respiration in the individual case. The guiding signs are found in respiratory changes, eye reflexes, general muscular manifestations and the degree of oxygenation as shown in the color of the lips, nails and skin.

From the viewpoint of the obstetrician, it is important that the pregnant woman requires a higher degree of oxygenation in the interest of the fetus, but that, on the other hand, in obstetric operations complete surgical relaxation is not only unnecessary, but indeed should be avoided.

In regard to the disputable advantage of rebreathing, Guedel<sup>1</sup> says: "The principal advantage of rebreathing is economy. Retention of carbon dioxide, as accomplished by rebreathing in major surgical operations for the purpose of respiratory and cardiovascular stimulation, has never been indicated to my knowledge in obstetrics." Ferguson<sup>3</sup> is decidedly opposed to rebreathing: "More than 25 per cent of babies delivered by nitrous oxide *analgesia* show slight crowing inspiration, immediately after birth, which may last for 24 to 48 hours. It seems due to a slight paralysis of the epiglottis with a resulting snoring sound. This condition is very much exaggerated when rebreathing is used to any extent. This condition is never present for more than a few inspirations, if the mother is given plenty of oxygen while the cord is still pulsating. Rebreathing is extremely dangerous for the baby and has no place in obstetrics."

Danforth<sup>8</sup> also objects vigorously to rebreathing so long as the fetus still is in the uterus. Allen<sup>7</sup> has discarded rebreathing. To the contrary, Irving<sup>9</sup> has employed rebreathing extensively for the sake of economy and has never observed untoward effects on the babies.

Among the unpleasant immediate after-effects the most frequently recorded is headache, usually of a mild and transitory character. This might be due to too intensive an administration of the nitrous oxide, rebreathing, or an inadequate amount of oxygenation, permitting a light degree of asphyxiation over a long time. Thorough oxygenation after delivery often precludes this complicating after-effect.

Such disadvantage would seem negligible in view of some of the striking benefits claimed for this method by Guedel. The patient after labor is not exhausted physically or mentally. The early puerperium is pleasanter, the mother requiring comparatively little attention. There is an actual shortening of the convalescent period. There is more rapid invo-

lution of the uterus, more favorable recuperation in general, all of which renders it advisable to permit the patient to leave her bed a day or two earlier. Fewer visits to the bedside are required.

It is being claimed that nitrous oxide-oxygen labor results in so normal a puerperium that lactation appears unusually early. The baby thus is better fed. This accounts, in the opinion of one writer, for the reduction of infantile jaundice from 25 to 12 per cent in his series of 100 nitrous oxide labors.

#### RESULTS

From a statistical analysis of a large number of personally observed cases Davis<sup>2</sup> draws the following conclusions: Labor seemed shortened by about one fourth of its average duration. The fact that the puerperium and thus the stay of the patient in the hospital is shortened on an average by a day and a half is important in so far as this saving nearly pays for the gases used in ordinary labors. Better and prompter supply of breast milk is evidenced by the fact that the immediate loss of weight of the newborn is below the recognized average. Relaxation of the soft parts and better control of the patient reduces the number and severity of perineal lacerations. Nitrous oxide does not favor postpartum hemorrhage. Nitrous oxide analgesia, in the normal case and properly administered, proves 100 per cent efficient.

Cherry<sup>10</sup> summarizes his experience as follows: Nitrous oxide given alone during labor, caused no ill effects to mother or fetus. The resort to forceps or pituitrin was not more necessary than in the average case of labor. There was no tendency to postpartum hemorrhage. Even prolonged administration did not cause damage to kidney or liver.

A series of 476 cases, analyzed by Danforth,<sup>8</sup> shows unsatisfactory analgesia in 7.5 per cent of the cases. He found this percentage practically the same in additional 1000 observations since the publication of his detailed report. No case of fetal death was observed that seemed fairly chargeable to the analgesia.

Similar favorable reports based on a smaller number of observations are available from other sources. It seems noteworthy that some obstetricians preceded the administration of the gases by the use of morphine or codeine in combination with scopolamine (Bacon, Dickinson).

This review may well be closed with a quotation from Davis: "Suffering during labor is but the tide in the ocean of motherhood and the desire of mothers is eutocia, not amnesia. The belief that pain is an inevitable accompaniment of labor has reconciled mothers to endure it, while the joy of successful motherhood has caused them to forget it. There is, however, no logical reason why women should suffer during labor. Surgeons will not permit their patients to suffer during an operation. Suffering, physical and mental, produces surgical shock. It increases the danger of puerperal complications and delays convalescence. The suffering can be relieved, and with perfect safety to both mother and child."

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## Selected Abstracts

### The Dangers of Curettage

**Fromme: Uterine Perforations Produced in the Treatment of Abortions. Their Diagnosis, Therapy and Forensic Importance.** *Ergebnisse der Geburtshilfe und Gynäkologie*, 1914, vi, 266.

This monograph presents the entire question in a very exhaustive manner, the writer basing his conclusions in part on 52 of the more important contributions to the topic that had appeared between 1908 and 1913.

The one significant and practical importance of this study lies in the fact that it leads to the inevitable deduction that the customary therapy of abortion is irrational and directly dangerous in the hands of the less experienced physician. The clinical symptom of hemorrhage, representing the usual indication or excuse for immediate interference, undoubtedly has attained undue and exaggerated significance in the eyes both of laity and physicians, especially in view of the unjustifiable disrespect for the actual risks of operative treatment. If interference is unavoidable, the cervical canal must be dilated slowly and wide. For the removal of the ovum or its rests in all cases of fresh abortion the introduction of any instrument, on principle, is objectionable. Compression of the uterus, or compression together with the introduction of one or two fingers in the uterus, in most instances, will yield the desired result. If, however, in a rare case, these efforts actually fail, a curette may be employed. But only a dull curette with a large loop, and then not for the purpose of "scraping out" but simply to "fish out" the remaining portions of placental tissue.

Out of a total of 322 cases recorded in literature only in 2.8 per cent the perforation was produced by the finger, in the remaining 97.2 per cent instruments were responsible for the injury, approximately in half of them, the curette, comparatively often also the uterine sound. A study of the more complicated injuries proves the particular danger of the forceps. With the exception of but one instance, forceps perforations were always associated with intestinal injuries, some of a most horrible kind. Not one of all the numerous models of abortion forceps on the market fails to appear on this list. Serious damage to the intestines has been seen also in perforations with the curette, obviously mostly with the sharp curette. With the dull curette such extensive injury occurs only if extreme force is used either in its introduction through an insufficiently dilated cervix, or in the attempt to scrape off placental fragments. It would seem that in the case of abnormal rigidity of the cervix serious injuries are not entirely avoidable even at the hands of the most experienced operator.

Whenever the operator has the feeling that the instrument passes, without resistance, too far into the uterus, he should assume that a perforation exists and immediately desist from any further attempt to empty the uterus. Smaller perforations cannot be diagnosed by the introduction of the finger, into the uterine cavity. The appearance of omentum or of intestines obviously leaves no doubt concerning the diagnosis. Unusual and even insuperable difficulty may be ex-



perienced in the diagnosis of perforations presumably made by another physician.

In regard to therapy, Fromme is of the opinion that in all doubtful but probable perforations an exploratory laparotomy or anterior colpotomy should be performed. Every diagnosed perforation must be subjected to prompt treatment which in the majority of the cases will be operative. Only in the case of the aseptic perforation with the sound is conservatism permissible. All statistics prove the advantage of operative interference over conservative measures. The conditions in each individual instance will determine the particular nature of the operation required, especially in regard to the necessity or advisability of removing the entire uterus.

In the last part of this paper the writer considers the legal responsibility of the physician in such cases of uterine perforation under German laws.

**Braude: Avulsion of Appendix through Uterine Perforation.** *Zeitschrift für Geburtshilfe und Gynäkologie*, 1914, lxxv, 780.

A patient, mother of four children, during the fourth month of her fifth pregnancy complained of chills. The consulted physician made the diagnosis of abortion and decided to empty the uterus. Failing with the curette, he resorted to the forceps and recognized in the first portion of tissue extracted a torn off appendix. Prompted by the severe hemorrhage he thoroughly curetted and irrigated the uterus and then "not to lose any time," himself brought the patient in a carriage to the clinic.

When seen by Braude, the patient was slightly anemic and had a good pulse of 80. The abdomen, especially on the right side was somewhat tender to pressure. Laparotomy was immediately performed, not quite two hours after the curettage. The small intestines showed three perforations, which were closed by suture. A small piece of appendix still on the cecum was removed in typical manner. The cecum was almost completely denuded of its serosa, and was covered as well as possible. Several ligatures were placed around hematomas in the mesentery. In the posterior culdesac a portion of the fetal vertebral column was discovered. In view of the evident infection the uterus was extirpated. Much to Braude's surprise the patient passed, without any symptom of peritonitis, through a satisfactory convalescence and was discharged well on the twenty-third day after operation.

**Williams, John T.: Accidental Perforation of the Uterus during Curettage, with Laceration of the Small Intestines.** *Journal American Medical Association*, 1919, lxxiii, 1361.

Patient, aged twenty-seven, had several miscarriages. Wassermann 4-plus. She was curetted in her home by a local physician for a miscarriage in the fourth month of pregnancy. He perforated the uterus and drew down a loop of intestines, tearing it completely across before he realized what he had done. When admitted to the Boston City Hospital several inches of lacerated intestines were protruding from vagina. Immediate laparotomy showed the ileum completely torn through, its proximal portion separated from its mesentery for about 12 inches. This portion of the ileum was resected and an end-to

end anastomosis done. The uterine perforation was closed with sutures. Patient made an uninterrupted recovery and left the hospital on the eighteenth day.

Accidental perforation, writes the author, during curettage is undoubtedly of frequent occurrence, but for obvious reasons it is seldom reported. It may happen at the hands of a skilled surgeon. If proper asepsis has been maintained, and the perforation is recognized immediately, harm seldom results. If the perforation is not recognized, the operator may continue to curette through the opening, and bring down a loop of gut (usually ileum) as in this case.

**Lincoln: The Dangers of Uterine Curettage.** *Annals of Surgery*, 1918, lxiii, 638.

Since its introduction, the curette has been very universally accepted in the surgeon's armamentarium, and used with the greatest freedom, the most acceptable rule of conduct being "when in doubt, curette." This situation is chiefly due to the fact that the pathologist offered moral support in the shape of a beautiful classification of the uterine scrapings into various types of endometritis. "Given a curette and a woman, the old time gynecologist will always find an endometritis." The fallacy of the former conception of endometritis was first established by Hitschmann and Adler. Since that time it has been demonstrated conclusively that true endometritis really is a very rare disease, and that hemorrhage is not its common characteristic. It also is now well understood that uterine hemorrhage is rarely cured by a curettage. But old ideas die hard, and the profession still seems reluctant to accept the evident fact that curettage is not only ineffective as a remedial agent but is fraught with great dangers.

Lincoln cites briefly the histories of 42 patients obtained through an inquiry from other physicians. In all of them curettage failed far from resulting in the desired benefit, indeed, 11 died after the operation. In concluding he states that it seems an easy task to compile a formidable list of accidents with a large mortality. Curettage is a major operation, not to be undertaken except under the very best conditions, and with every possible precaution, by a careful and skillful surgeon.

**Barnes: The Indications, Dangers and Contraindications of Uterine Curettement.** *American Journal of Obstetrics*, 1918, lxxvii, 940.

The curette is an instrument of diagnosis in securing material whereby we may differentiate between malignancy, endometritis, abortion and uterine polyps. Positive contraindications to the employment of the curette are: Suspected pregnancy and obvious or probable systemic infection by way of the endometrium, especially streptococcal infection. The dangers ever to be kept in mind are: Uterine perforation with intraperitoneal infection or the introduction of irritating fluids, accompanying hemorrhage and probable visceral injury; and, particularly in acute conditions, the removal of a leucocytic barrier, opening a gateway to general infection.

**Bovée: A Warning against Promiscuous Uterine Curettage.** *Surgery, Gynecology and Obstetrics*, 1920, xxx, 618.

Of all gynecologic operations performed, probably the most frequent is curettage. The uterine curette, introduced to an embryonic

state of development of gynecology, as it was, rapidly attained a high degree of popularity. That the most slovenly and ignorant physician resorts unhesitatingly to the curette for various diseases of the uterus, real or otherwise, and even of the appendages, is a notorious fact. Uterine curettage has a limited and constantly narrowing field of usefulness in gynecologic practice. Its principal function is to secure tissue for diagnostic purposes, to remove polypi, and in the treatment of exfoliative, and rarer cases of senile endometritis, of sterility, and finally to extract products of conception after all other methods have failed. The dangers of curettage are numerous. Not infrequently a pregnancy in its first month is inadvertently interrupted. The literature teems with cases of perforation with or without dangerous sequelæ and even death; and it must be remembered that for obvious reasons by far the larger number of such perforations are never reported. Nor are they, by any means, confined to the unskilled operator. Often infection follows curettage, in many other cases a latent infection of the appendages is roused to new activity. The investigations of Curtis concerning the bacteriology of the normal uterus and cervical canal convincingly prove the danger of all intrauterine instrumentation. The cervical canal is so constantly infected that it does not seem strange that infection may be carried into the uterus by sound, dilator, or curette.

**Rawls: The Status of Uterine Curettage Based on Hospital Records.**  
*American Journal of Obstetrics, 1919, lxxix, 534.*

The writer establishes the correct status of curettage in advanced gynecologic practice by a careful analysis of the records of over 20,000 gynecologic patients of the Woman's Hospital in New York. His conclusions are as follows: (1) About 96 per cent of gynecologic cases show no endometrial changes, and therefore curettage is unnecessary. (2) In about 4 per cent, showing endometrial changes, the procedure is of questionable therapeutic value. (3) As a diagnostic measure it is of practical value in only 5.1 per cent of carcinoma of the uterus. (4) When curettage is performed in a hospital and by skilled operators, there is a morbidity in at least 5.5 per cent.

**Markoff: Sudden Complete Relaxation of the Uterus during Curettage.** Original in Russian. Abstract in *Zentralblatt für gesamte Gynäkologie und Grenzgebiete*, 1914, v, 162.

The possibility of such an extreme atonic relaxation of the uterine wall during curettage was first positively established by Beuttner in 1908. The writer describes in detail four personal observations of this occurrence. In all four cases the abrasion was done without a general anesthesia. The distinct resistance of the uterine wall to the pressure of the curette suddenly disappeared, but returned promptly after intrauterine irrigation with a hot antiseptic solution. None of the patients offered any subjective symptoms. There was no noticeable effect on the circulatory or respiratory system, no signs of collapse. They all recovered promptly. The possibility of perforation in his belief is excluded. Predisposing factors for such an atony are subinvolution, hypoplasia, metritis, anemia, and degenerative changes in the ovaries. The immediate cause lies in an organic or functional insufficiency of the uterine muscle. The actual mechanism



of the sudden dilatation is still obscure. Experimentally the condition cannot be reproduced either by the introduction of a foreign body into the uterus, or by stimulation of the uterine ganglia. Differential diagnosis from perforation might prove difficult, but prompt restoration of the normal tonus seems conclusive. As soon as the atonic condition becomes evident, the instrument must be withdrawn from the uterine cavity, because otherwise the subsequent acute contraction of the uterine wall over the instrument in itself may cause a perforation.

**Thompson: Drainage versus Scraping in Curettage of the Uterus.**  
British Medical Journal, 1918, i, 53.

The writer protests vigorously against the modern tendency of a slight and quick cervical dilatation by means of mechanical stretchers, just wide enough to permit the introduction of a curette. He compares this new practice with the former usage of obtaining a wide dilation, gradually and slowly, and concludes that the recent modification has brought a good old operation into undeserved disrepute. Any benefit derived from a uterine curettage does not result from the actual scraping of the uterine cavity, but from the continued satisfactory drainage secured by proper dilation of the cervical canal. The operation of "Curettage" probably would yield equally good results without any actual scraping, if only the dilation of the cervix is ample.

**III, Edward J.: Accidental Removal of Intestines Through the Vaginal Vault.** American Journal of Obstetrics, 1919, lxxix, 29.

This paper is of interest in that it considers certain medico-legal aspects of such an accident. A young woman, pregnant for several months, had been flowing for some time. The attending physician, with a forceps, removed what he thought were fetal intestines and burned them. The patient died immediately. A very superficial autopsy was made by the operator in the presence of a deputy county physician, and the body was allowed to be interred after embalment. A month later the body was exhumed, and another autopsy showed the empty uterus with a large rent and all the intestines had been removed. The report showed that the small intestines with the mesentery had been removed at the spine. Among the various assertions made to explain this striking finding was that the undertaker when closing the body after the first autopsy had removed the organs. Ill gave it as his opinion that the mesentery could have been severed from the spine only by means of a very sharp knife. This case induced him to study on cadavers the mechanism of intestinal injuries through uterine rents, and the effect of embalming fluid on the remaining portion of the torn mesentery. His conclusions, based on these experiments and some personal observations, are as follows: (1) Any portion of the bowel can be pulled away by traction with a forceps through a rent in the uterus or vagina. (2) The point of separation will be the junction of the bowel with the mesentery. (3) In some subjects the separation will be extraperitoneal in a large measure. (4) The mesentery cannot be pulled away from its origin of the spine or elsewhere.

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## Necrology

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**Benjamin Franklin Baer, M.D.**

January 27, 1846—September 11, 1920.

Born in Cumberland County, Pennsylvania, Dr. Baer was graduated from the Medical School of the University of Pennsylvania in 1876 and appointed an Instructor in Gynecology in his alma mater in 1878, which position he held till 1885, when he resigned to accept the Professorship of Gynecology in the Philadelphia Polyclinic Hospital and College. He remained in active association with this institution until two years before his death.

Dr. Baer was a member of many medical societies and at one time held the office of president of the Philadelphia Obstetrical Society. The deceased occupied a prominent rôle in the development of American gynecology, a field which he entered during its formative period. He was a bold and brilliant operator and among his more eminent contributions to the specialty is the development of a method for the surgical treatment of uterine fibroid tumors. For their removal he devised a particular technic of supravaginal hysterectomy which was later widely employed. The titles of his most important literary contributions deal with lacerations of the cervix, the significance of metrorrhagia at the time of the menopause, and a plea for early diagnosis in the pelvic diseases of women.

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## Original Communications

### PATHOLOGY OF COMMON PUERPERAL LESIONS\*

BY JOHN OSBORN POLAK, M.D., F.A.C.S., BROOKLYN, N. Y.

IT IS estimated that twenty thousand women in the United States die annually from childbirth and approximately 43 per cent of this total succumb to puerperal infection, not to speak of the thousands of women who are permanently invalided, as a result of the morbid processes which these infections produce. That this high mortality is preventable cannot be contradicted; yet year after year, the same students whom we send out from our medical schools, whom we have trained in asepsis and conservation, continue to infect and traumatize their patients. It seems odd that the physician who would hesitate to open the abdomen for the removal of a simple appendix, feels perfectly equipped as soon as he has obtained his diploma, to apply forceps or to do any of the several obstetric operations, without a pang of conscience or apparent appreciation of the great danger of infection and the chance of losing both the mother and the child.

I am glad to say that in the past few years in the Metropolitan district, there has been a definite diminution in the amount of septicemia seen by those of us who are practicing consultation obstetrics. Perhaps this is due to the fact that many of the profession are specially preparing themselves for obstetric practice; for most teachers are endeavoring to make the specialty just as important as major surgery.

One cause of the relatively high mortality, is the confusion which exists in the minds of many as to the exact pathologic diagnosis in any given case. The pathology in a case of puerperal infection should

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."



be just as definite as the pathology of a surgical lesion; yet almost all cases of childbed fever are included under the general term of puerperal infection and accorded empiric treatment. The purpose of this brief paper is to outline the pathology and clinical course of the several common puerperal lesions, and suggest the indications for, and summarize the treatment to be employed.

A puerperal infection, like any other infection, depends on the inoculation of the puerperal wound by bacteria. In order to thoroughly grasp the physiologic process which actually takes place we must appreciate the fact that the uterus during involution is a puerperal wound. Its interior is undergoing the normal process of repair, and inoculation of this wound will produce either a toxemia or a definite inflammatory reaction, depending largely on the character of the infecting organism.

At first this wound infection is a local process which may be illustrated in the infected perineum, or the infected cervix tear, or the infected endometrium. In each there is an inflammatory reaction in the adjacent tissues, which limits extension of the infective process and confines it to a circumscribed area about the wound or within the uterus. In these localized lesions the pyrexia and other constitutional symptoms are due to two factors, the toxemia resulting from an absorption of the toxins liberated by the bacteria, and to the tissue reaction excited thereby.

The process may be a spreading infection extending beyond the wound area; this is due either to the increased virulence of the infecting bacterium or to the diminished resistance of the tissues. This spreading infection may occur by extension through the lymphatics within the walls of the uterus, or by spreading to the lymphatics in the parametrium produces a parametritis, or a peritonitis, or even a bacteriemia. The infection may also extend through the blood vessels in which case it manifests itself clinically as a thrombophlebitis, an embolic pyemia, or a bacteriemia.

Considerable blood loss at the time of labor always predisposes to infection, for in cases of hemorrhage the uterine retraction is faulty as there is more or less uterine atony. This lowers the individual resistance and consequently reduces the immunity and tissue reaction. Sampson has shown, by injection of the uterine cavity, that proper retraction and contraction of the uterus with an intact endometrium offers a barrier against venous invasion. He found that, with the uterus contracted and the endometrium intact, it was not possible to force a barium solution from the interior of the uterus into the venous radicals. On the other hand, after the endometrium has been removed by the curette, or during menstruation when the endometrium was partially desquamated and the uterus relaxed, he was able to inject material from the interior of the uterus directly into the venous circulation.

This to my mind, is the best proof that a retracted uterus with its normal granulation zone acts as a barrier against the invasion of bacteria from the vulva, vagina, and cervix. Bacterial flora are normal to these regions; but are usually innocuous unless they are introduced beyond the os internum and into a favorable culture medium. After the first forty-eight hours of the puerperium, bacteria may be found within the cavity of the uterus; but if the normal process of wound repair continues, the cavity sterilizes itself by the end of a week. The endometrium becomes infected by the ascent of this vaginal bacterial flora, which is either carried into the uterus by the hands of the obstetrician or by his instruments, or it ascends along bridges of membrane hanging down from the cervix. This permits the bacteria to ascend from the vagina through the cervix, which has had its protective barriers removed by the process of childbirth. Whether these bacteria, when they reach the interior of the uterus, become scavengers or virulent invaders depends largely on the contraction and retraction of the uterus and on the virulence of the bacteria.

If the uterus is well retracted, a leucocytic barrier is thrown out between the infected endometrium and the venous radical, for uterine retraction actually produces a passive congestion in the endometrial tissues. Furthermore, inoculation of the surface of the endometrium immediately excites tissue reaction in the basic membrane and adjacent muscle tissues and the leucocytic wall becomes supplemented by a layer of numberless round tissue cells and this causes the endometrium to be exfoliated in masses and substitutes a granulation zone.

If one can picture the entire interior of the involuting uterus as a large granulating wound, we will be less liable to mistake our indications for surgical treatment. In our experience, infection of the endometrium in the relaxed uterus, and inoculation of a wound in the cervix, are the two most frequent pathologic occurrences that follow delivery. In each we have a definite and typical picture. Ordinarily during the course of normal involution with proper uterine retraction and drainage, the uterus in normal position is capable of sterilizing its cavity. However, when retraction and contraction is poor, the contained bacteria not only multiply with amazing rapidity, owing to the retained blood clots which act as a culture medium, but may gain entrance to the uterine and parametrial tissues through the lymph channels or the venous radicals. The puerperal endometrium after labor or abortion should be considered as a traumatized wound undergoing the normal processes of wound repair. This wound may be infected by pathogenic microorganisms in which case it virtually becomes a large puerperal ulcer. It must not be supposed that the presence of necrotic decidua, or a piece of placenta or membrane, or the entire placenta retained within the cavity of the uterus will produce an endometritis. In order to have an inflammatory reaction in the endometrium, there

must be bacterial invasion. The retained products of conception simply act as a culture medium for bacteria and favor their multiplication. The presence of retained secundines interferes with proper contraction and retraction of the uterus, which in turn diminishes the normal protection to the individual; and while relaxation favors the spread of infection, it does not produce sepsis, unless there is bacterial infection of the uterine contents.

Clinical experience has shown us that a well contracted uterus in normal anteversion is capable of emptying itself of its contents if infection is not introduced from the outside. A relaxed uterus may become bent upon itself, be caught behind the pubis and become extremely anteflexed, or it may be caught below the promontory and become retroflexed; and thus prevent the free outflow of lochia, produce a lochiometra and favor the absorption of toxins, resulting in local pain and constitutional disturbances. This is a mechanical process which is immediately relieved by the establishment of free drainage. On the other hand, a putrid or saprophytic endometritis is an infection of the dead and necrotic superficial structures retained within the uterus which produce irritant material composed of bacterial toxalbumoses and ptomaines. These in turn irritate the endometrium and excite a tissue reaction. These superficial necrotic structures have bacteria in them or on them.

#### ENDOMETRITIS PUTRESCENT

Contrary to general clinical acceptance Schottmüller has shown that the majority of cases of putrid endometritis are due to an obligate anaerobic streptococcus; but in this form of infection the uterine tissues are protected from deeper invasion by the presence of a well-defined granulation zone. The ptomaine and bacterial toxalbumoses induce an endometritis by chemical irritation which excites a round-cell, proliferation in the deeper layers of the endometrium, and this in turn, brings about a superficial necrosis of the overlying tissues. The degree of this necrosis depends, in part, upon the power of the contraction and retraction of the uterus. If the uterine contents are evacuated within a reasonable length of time, extensive necrosis of the endometrium does not result, but if the tissue reaction continues and the round tissue cells become banked up beneath the endometrium, the necrosis is extensive. If the necrosis is slight we have only an intensification of a normal exfoliation of the mucosa. Thus, with the cause removed, with the emigration of the phagocytic leucocytes and the formation of an antibactericidal lochia, the uterine cavity is cleansed. If, on the other hand, the necrosis is considerable, it may interfere with the normal regeneration of the endometrium; hence the uterine cavity is open to the migration of the pathogenic cocci from below, a mixed infection may develop and the patient may succumb from the severity of the infection.



When a saprophytic endometritis exists within the uterus there is a definite train of characteristic symptoms. The lochia remains bloody and fetid, and is frothy from an admixture of gas bubbles. An examination of the secretions shows the presence of saprophytes and numberless cocci of low virulence. The after-pains continue and from time to time a clot is expelled by painful uterine contractions. These are all evidences of a relaxed uterus. Besides this, there is a toxemia from the absorption of the toxins produced by the superficial necrosis. This absorption from the uterine cavity causes an elevation of temperature and a slight acceleration of the pulse rate. On examination we will find the involution of the uterus retarded; the uterus is large, tender, and more or less relaxed. The abdomen may be slightly distended, but there is no tenderness except directly over the uterus. Should the pelvis be digitally explored, the cervix will be found open, swollen and eroded, and if the gloved finger is passed into the uterine cavity, clots and necrotic debris are encountered and the interior of the uterine cavity is rough and shaggy. This makes up the clinical picture.

We have come to consider relaxation of the puerperal uterus a serious condition, for it allows the spread of the bacterial invasion through open lymph channels and venous radicals. The prognosis of this type of infection depends on the establishment of proper uterine drainage by retraction and contraction of the uterus. When uterine drainage is established and the leucocytic zone is developed, the fever subsides. Hence, it will be argued, if expulsion of the contents is followed by a prompt subsidence of the symptoms, why not empty the uterus of this necrotic debris by surgical methods? Experience has taught us that any sort of trauma to the delicate granulation wall of the puerperal uterus which is confining the infection within the cavity, opens fresh avenues of extension, and that lateral parametritis is a constant sequel of attempts at digital or instrumental evacuation. It does no harm to remove sterile contents but intrauterine manipulation always spreads infection when the content is already infected. It is in this character of case that Dr. Edward III, of Newark, has for years been using the alcohol irrigation, with gauze drainage which was suggested years ago by Caroso. We have found that it gives excellent results in these relaxed uteri which are faulty in their drainage because of their position.

#### COCCAL ENDOMETRITIS

The second type of infection met within the uterus, may properly be called a *coccal or pyogenic endometritis*. In this form the infective bacteria, the streptococcus or other pyococci, have more marked invasive qualities and attack the living tissues. They penetrate into the lymphoid lining of the myometrium, and cause a prompt tissue reaction in the basic membrane and a necrotic layer in the endometrium, which resembles the false membrane of diphtheria.

Whether these cocci advance further than the interior of the uterus, and invade the lymphatics and blood vessels, or remain confined within the uterine cavity, depends upon the completeness and development of the granulation zone, the virulence, and the penetrability of the invading bacteria. If the reaction is sufficient to excite prompt tissue resistance and the leucocytic barrier increases in thickness, the lochia acquires antibactericidal properties which tend to sterilize the interior of the uterus. This observation has been checked up frequently in our clinic. With every puerperal endometritis there is always an associated metritis. This is a defensive reaction on the part of the myometrium against the invading cocci. In this reaction small round tissue cells, leucocytes, fibroblasts, and polyblasts are thrown out and are deposited between the muscle fibers and around the gland tubules, halting the further extension of the cocci. From this primary endometritis and metritis, the bacterial invasion may extend through the lymphatics in the uterus into the surrounding connective tissue, or to the peritoneum, or through the veins in the placental site to the blood stream. Since the infection often begins at the placental site, much depends on its condition at the time of exposure. If the uterus is well retracted and the sinuses are closed the defense at this point is effective. On the other hand, if the sinuses are plugged with aseptic thrombi, virulent cocci may infect these thrombi directly or penetrate between the sinuses and enter the vessel from the outside and thus gain entrance to the circulation. *Infections due to the streptococcus pyogenes and the pyococcus alone* do not give rise to feter, and the interior surface of the uterus is usually smooth and not deeply necrotic. As a rule the bank of granulation tissue suffices to limit the infection to the uterus, unless Nature's beneficent processes are disturbed by the meddling of the accoucheur. The clinical picture is one of acute infection. The symptoms are of greater severity than in the putrid form and are briefly as follows:

For the first two or three days the puerpera is fairly comfortable, but there is usually some indication of brewing trouble such as malaise, a higher pulse rate and temperature than is normal, restlessness, pain in the uterus, and prolonged after-pains. On the third, fourth or fifth day, there is a slight chill or chilly sensation with a rise of temperature, headache, anorexia, and the patient is conscious of a feeling of heat over the body. The pulse may range from 100-140 and the temperature from 101-104° F.; depending on the severity of the infection. The abdomen may become slightly distended, but there is little or no tenderness except directly over the uterus; the involution of the uterus is always retarded. If, however, the infection extends through the myometrium to the peritoneum, there is tenderness over the uterus and in both inguinal regions. The lochia is at first unaltered, but within forty-eight hours it loses its characteristic qualities and becomes serous, flesh colored, or seropurulent.

The lochia is not foul unless large numbers of saprophytes are present. The lochia, however, has caustic infective qualities, and the wounds in the vagina and about the vulva, which are bathed in them, are covered with a pseudodiphtheritic membrane.

On physical examination, the cervix is closed and the uterus fairly well retracted and unless there has been parametrial extension, its mobility is not interfered with. Were it possible to make a digital exploration of the interior of the uterus, it would be found smooth and the endometrium bathed in an odorless purulent or sanguinopurulent discharge. Lymphatic invasion from the cervix is shown in the parametritis postica so commonly found postpartum, which is the chief cause of the backache experienced in the puerperium. Extension of infection from tears in the cervix, and higher up in the uterus, is generally through the lymphatics in the broad ligaments. This extension produces a lateral parametritis or cellulitis.

#### CELLULITIS

Pelvic cellulitis or parametritis is an inflammatory reaction of the pelvic cellular tissue to a bacterial invasion. The bacteria reach the parametrium through the lymph stream and excite a tissue reaction in which serum, leucocytes and round tissue cells are poured out producing a local inflammatory swelling. In order that we may better appreciate where to look for these inflammatory swellings, it may be well to briefly review the anatomic arrangements of the pelvic connective tissue.

The pelvic connective tissue lies under the peritoneum and between the pelvic peritoneum and the pelvic diaphragm. It forms the loose connecting and supporting areolar structure between the organs and the pelvic wall, between contiguous viscera and the soft structures. It spreads from the uterus as a center and radiates outward in all directions, each part reaching the pelvic wall. It surrounds and supports the blood vessels, nerves, lymphatics and forms thin sheaths. It is condensed into strong bands and ligaments forming the aponeuroses of muscles and the ligamentary attachments of the pelvic viscera. Infections from traumatism of vagina and cervix chiefly involve this loose, fatty tissue and the infection is directed by and confined between the fascial sheets and ligamentary planes.

The lymphatic channels which drain the greater part of the vagina, the cervix and lower uterine segment pass out along the base of the broad ligament, and are supported by this arbor of cellular tissue. These follow the course of the uterine vessels to the hypogastric and iliac glands. The lymphatics of the fundus and upper part of the body of the uterus follow the ovarian vessels in the infundibulopelvic ligament to the glands at the bifurcation of the aorta and the lumbar group. Lymph channels also run into the uterosacral ligaments to the sacral glands and through the round ligaments to the inguinal glands.



## ETIOLOGY

The majority of cases of cellulitis are due to infection by the streptococcus pyogenes. The staphylococcus and bacillus coli, and occasionally the gonococcus, are found in combination, but the streptococcus is the chief infecting agent of cellular tissue. The severity of the infection depends on the virulence of the infecting organisms. It has not been proved that the gonococcus can by itself produce primary pelvic cellulitis, neither does an uncomplicated gonorrhea give rise to the same inflammation and abscess formation seen in a streptococcus infection.

The most common avenue of entrance is through injuries to the cervix and vaginal vault during labor; for besides the general softening of the tissues, the enlargement of the connective tissue spaces, and the increased vascularity due to pregnancy, there is a direct bruising of the parts during labor, all of which favor infection.

The cervix and surrounding tissues are subject to the greatest trauma, consequently the tissue resistance here is lowest. Furthermore, lacerations at these points open into extensive cellular spaces. Even trivial injuries may act as points of ingress; but, as a rule, there is the history of an instrumental delivery, manual or bag dilatation, or a dry labor with frequent vaginal examinations. The chances of infection are greater under these circumstances. This form of inflammation is comparatively rare after abortion as the cervical tissues are not subjected to such a degree of trauma; hence, tubal rather than parametrical complications with peritoneal extension are the usual course.

## PATHOLOGY

The organisms invade the lymphatic channels and by their presence, and the toxins they produce, excite a hyperemia which is followed by an effusion of protective serum and a hurried migration of leucocytes into the soft areolar tissue, which with the deposition of small round cells make up the exudate. This increases the tissue bulk and gives rise to a soft swelling which later becomes hard from the formation of a more fibrinous exudate. This exudate is generally limited, at first, to the base of the broad ligament on the involved side. As the exudate is poured out, it follows the line of least resistance in the cellular tissue between the fascial sheets forward and outward to the anterolateral pelvic wall and iliac fossa; or it may proceed backward along the uterosacral folds, lifting the posterior layer of the peritoneum. The fibrinous deposit which is thrown into the pararectal and prevertebral connective tissues fixes and displaces the uterus and rectum, and more or less obliterates the portio vaginalis, holding the pelvic organs in a hard sensitive mass; or the exudate may spread forward to the base of the bladder and so reach the anterior pelvic and abdominal walls.

Clinically we have found that the exudate may spread in almost any direction along the cellular tissue planes. It may be unilateral or

bilateral, most frequently the former; or it may spread around the cervix from side to side, obliterating the portio vaginalis, leaving the os as a mere dimple in the vaginal vault; or the bacteria may follow an unanatomic course, even passing through muscle or fascia, in which case the exudate may be found in locations where it is least expected. The exudate varies in its extent and consistence depending on the virulence of the germ and the resistance of the patient. In mild cases there may be nothing but a simple inflammatory edema; and again, in the more virulent types of cellular infection, the exudative process is limited to a serous and poorly defined cellular infiltration, for the bacteria quickly pass through the lymphatics to the peritoneum or into the blood stream. Fortunately for the protection of the individual in most cases there is an adequate protective tissue reaction with the formation of large exudates. Section through these masses shows the lymph vessels thickened, tortuous and beaded, and a yellowish or whitish pus exudes from numberless minute openings. The lymphatic chains are surrounded with exudate giving it a glistening, glassy, moist appearance. The veins are often thrombotic, either from primary or secondary infection; or the thrombi may undergo puriform degeneration, the debris breaking up and getting into the circulation forming infected emboli.

As the exudate increases in size, the blood supply is increased; this is especially apparent on the venous side and later, as cicatricial tissue forms and the scars shrink, the arteries are kinked and varicosities occur in the veins, while the ganglia and nerves may become pinched in the contracting cicatrices. This explains the pain and the frequency of pelvic varicosities in patients who give a history of an infected puerperia.

Coincident with the pouring out of exudate into the cellular tissues in the broad ligaments there is always a subperitoneal edema and necessarily the pelvic peritoneum takes part in the inflammation and throws out an exudate upon its surface which causes the tubes and ovaries to become matted together and adherent to the broad ligaments, uterus or the intestines, which, clinically, give the impression of large exudate masses.

It may be stated that parametritis always excites some degree of perimetritis. This inflammatory exudate may undergo complete absorption or may go on to suppuration. If absorption occurs there is always some pathology which permanently remains. When an exudate suppurates the pus is discharged externally or becomes encapsulated, limiting the mobility of the pelvic viscera and occasioning premenstrual pain. In the milder infections, with a serofibrinous exudation, complete resolution usually takes place. Large masses of fibrinous exudate may completely disappear without leaving much edema or tissue damage. There are, however, always varicosities of the pelvic veins to tell the story of the intense venous engorgement, necessary to supply the protective exudate needed in Nature's attempt to bury the infecting invaders.

In the more severe infections, suppuration may occur with the formation of an abscess cavity or necrotic areas may appear in various parts of the exudate, and these become converted into pus. Commonly there is only one cavity which results from the conjunction of several pus foci. Occasionally the entire pelvis may be riddled with abscesses. Multiple foci of suppuration are commonly of thrombotic origin and really belong to a different class than the simple cellulitic abscess.

These large abscesses, dependent upon their proximity to one of the hollow organs, are apt, in the course of from twenty to seventy days, to point; and unless they are evacuated by operative measures, may break into the rectum, bladder, vagina or through the skin above Poupart's ligament or into the peritoneal cavity. If the pus is completely evacuated, the cavity closes rapidly. Unfortunately when these abscesses open spontaneously, it is seldom at the most dependent point; there may be other or more remote foci, hence the pus is not completely evacuated and the septic process may be kept up for weeks or months. Sometimes the abscess does not open and Nature cures the condition by encapsulating the pus. The wall of the abscess is thickened and becomes firm with fibrous tissue, while the more fluid part of the pus is absorbed. Such a tumor may persist in the pelvis for years, gradually shrinking in size.

It is important to note that the encapsulated germs do not always lose their virulence, but may on the occasion of subsequent traumatism or operation break out with increased virulence and cause a bacteriemia. Unless there has been considerable trauma of the soft tissues, it is remarkable to see how little scar tissue is left after these connective tissue abscesses heal. On the other hand, when there have been extensive lacerations and trauma of the soft parts, as tears through the cervix, into the lower uterine segment, and into the base of the broad ligament, the woman is left with a permanent displacement of the uterus owing to contraction of the cicatricial tissue.

Pelvic cellulitis may be complicated by femoral thrombosis and phlegmasia alba dolens. Though I believe that the more severe cases should be regarded as a septic thrombosis with an accompanying cellulitis, it is conceivable also to believe that an immense exudate may of itself be sufficient to cause compression of the pelvic veins and produce edema of the thigh or leg. This is so, especially when the exudate is in the anterior portion of the pelvis between the peritoneum and the pelvic bones.

#### BACTERIEMIA

Bacteriemia means the presence of bacteria in the blood. It is an acute infectious disease, produced most frequently by the streptococcus septicus and occasionally by the staphylococcus. *These cocci with their toxins* produce changes in the blood destroying the red cells, as well as the leucocytes, and cause degenerative changes in the organs through which they pass, notably, the heart, the liver, and the kidneys.



Besides the streptococcus and staphylococcus, which are the most common invaders of the blood stream, the pneumococcus, the bacillus pyocyaneus, the gonococcus, the bacillus aerogenes capsulatus, and several anaerobic bacilli, have been found in blood cultures.

In postabortal and puerperal infections entrance is gained into the blood stream by two routes; first, by lymphatic extension; second, by direct invasion of the venous radicals and sinuses. Each mode of invasion proceeds in a definite manner and the clinical pictures produced differ so much that it is generally possible to make a differential diagnosis. Occasionally, however, the pictures are indistinct and differentiation is impossible. The lymphatic form develops from an endometritis; the infection in turn extends to the myometrium, and the parauterine lymphatics, but it is so virulent that instead of exciting an active reaction in the parametrium and parauterine spaces, the reaction simply excites a serous exudate with local edema and the infection proceeds directly into the blood stream, or through the lymphatics to the peritoneum, exciting an acute purulent peritonitis. The vascular form almost invariably begins as a uterine phlebitis, primarily as an infection of the thrombi in the placental site with an extension of the infected thrombi into the veins. From these infected thrombi the bacteria enter and multiply in the blood, and consequently locate in distant organs; such as the pleura, the lung, the endocardium, and the brain. Occasionally the thrombi may suppurate, but this is not common in streptococcemia. However, as a result of such a suppuration, bits of infected fibrin or actual pus may get loose and be carried away by the blood stream to remote parts of the body, and there locate and cause local abscesses. The lung, kidneys, and the brain are the points most frequently reached by these infected emboli.

In blood stream infections the local pathologic reaction is considerable, consequently the local symptomatology is insignificant; for whether the bacteria enter the blood stream via the lymphatics, or via the veins, their transit is so rapid and the reaction caused so insignificant, that appreciable local lesions must necessarily be absent. For the entrance of bacteria into the blood stream, there must be a puerperal wound which is inoculated by bacteria. This may be at any point in the genital tract, the vulva, the vagina, the cervix or in the placental site.

Women who have had severe postpartum hemorrhage, or have been toxic prior to their delivery, offer less resistance to coccal invasion than women whose antepartum or interpartum period has been less depleting.

In the vascular forms of bacteriemia the lymphatics are not involved at all, or if so, to a very decidedly less extent. The veins of the placental site are filled with large thrombi which are swarming with bacteria. The bacteria erodes the endothelial lining of the vessel; fibrin is therefore deposited on the eroded surface, and a clot occludes the lumen and this process advances through the venous plexuses of the broad liga-

ment into the ovarian and iliac veins, and even to the vena cava. From the surface of these thrombi, bacteria are liberated into the blood stream, and, if they are strong enough, multiply in it, and a fatal bacteriemia may result. If the bacteria are less virulent the process becomes more chronic, the thrombi undergo puriform softening, and solid bits of thrombus or droplets of pus break loose, float in the blood stream, lodge in distant parts of the body, setting up new foci of suppuration, causing a condition of true pyemia.

#### SYMPTOMS

A period of incubation of from one to three days usually precedes the outbreak of the severe symptoms. Occasionally threatening prodromes appear within a short time after the inoculation, and the woman becomes seriously ill and may die within thirty-six hours. Ordinarily the prodromal stage is manifested by the signs and symptoms of the local process in the uterus from the site of which the bacterial invasion of the blood has extended.

In consideration of the pathology, we have shown how bacteria may enter the blood stream with infected thrombi from a local ulcer through the lymphatics, from an endometritis or parametritis, or from the placental site. It is, however, frequently impossible to determine when or how the germs get into the blood; yet since our bacteriologists have been using anaerobic methods, we have often been able to cultivate the streptococcus from the blood where the diagnosis of a purely local lesion has previously been made.

The following syndrome is indicative of a serious bacteriemic infection, though it is claimed that absorption of toxins in large amounts will produce similar symptoms. This I cannot verify from personal experience. Blood invasion is ushered in by a severe chill lasting from five to thirty minutes. During the chill the skin is pale, the face is pinched, and the lips and fingers cyanotic; the temperature rises rapidly to 103-104° F. and the pulse rises at once above 120, varying from 130 to 160. At first the pulse is full and bounding; but it soon becomes soft and compressible, for the bacteria and toxins in the blood weaken the heart muscle. Owing to the rapid destruction of the red blood corpuscles, the oxygen-carrying power of the blood is diminished and the patient exhibits marked pallor; the finger tips are cyanotic, the respirations are hurried, and the woman looks profoundly sick. The white blood cells show no tendency to increase owing to the intense and overwhelming intoxication. As a result of the rapid production of toxins the non-striated muscle in the heart and intestinal tract undergo cloudy swelling and lose their tone. As the heart weakens, the blood pressure falls, and there is more and more tympany from intestinal paresis. This further embarrasses the heart and respiration. Malaise becomes a prominent factor early in the attack, the woman appears prostrated and is appre-

hensive of impending danger. Headache and sleeplessness are constantly complained of, and even though the patient has no pain, she does not sleep. This symptom is particularly ominous. The mind may remain clear until near the end. This, however, is unusual, as a mild delirium becomes more marked.

The bacteriemic symptoms may occur alone or be succeeded by the symptoms and signs of a purulent peritonitis, i.e., nausea, vomiting and pain. These with the facies hippocratica show the end is not far distant. If the bacteriemia has occurred as the result of rapid lymphatic invasion from a coccal endometritis, local pelvic symptoms may coexist. The lochia are usually profuse and putrid, the result of a gangrenous endometritis; though in the severer types the lochia may be scant and free from odor. The odor is pungent and the puerperal wounds become necrotic. Signs of peritonitis such as tenderness, tympany, spreading rigidity, ileus, etc., begin, and if the patient lives long enough, the picture becomes one of virulent peritonitis. When this occurs the temperature may go down, but the pulse always rises and the tongue becomes dry. A peculiar sickening fruity odor is noticed about the patient, and while she feels easier, the objective symptoms grow worse. The body is cold, the face flushed, and beads of cold perspiration appear on the forehead; while the nose, lips and ears are of a leaden gray. Death usually occurs in coma preceded by pulmonary edema.

The duration of the disease is from two to ten days. It is especially virulent if it begins during labor, and then its course is usually short and violent. Eruptions on the skin resembling the exanthemata occasionally occur. This has nothing in common with true scarlatina; though the pregnant woman is not immune to the disease. It is really a toxic streptococcic erythema. There is no angina and this helps in making the differentiation.

Broadly speaking, the treatment depends on the pathologic diagnosis and may be considered under the following heads: 1. Local measures which secure drainage and uterine contraction. 2. General supportive measures that increase the patient's resistance, which should include transfusion. 3. Specific remedies are of especial value in blood stream infections. 4. Finally, surgical measures. The latter are only applicable to abscess formations, thrombotic lesions of the pelvic veins, and spreading peritonitis.



## VERSION\*

BY IRVING W. POTTER, M.D., F.A.C.S., BUFFALO, N. Y.

IN ADDRESSING you upon the subject of version this evening, I assume that I am speaking to men who have been specially trained and are experienced obstetricians, and, therefore, if I am bold enough to criticise present day teaching, it is because I have found nothing that would assuage and alleviate the pains and the agonies of the second stage of labor which, to my mind, is the desired aim of modern midwifery. The abdominal surgeon taught us that it was safe and practically without mortality to invade the peritoneal cavity and uterus from above, and thus he led the way for our modern Cesarean section which has resulted in the saving of many lives. I propose to demonstrate to you that it is equally possible and infinitely less hazardous to invade the uterine cavity from below and bring about the safe delivery of the baby without pain and suffering, or undue injury to mother and child.

I shall not attempt to give you the indications for a version, but rather confine my remarks to my method of performing version and the results to mother and child by reason of the operation. Of course, it is self-evident to you all that my range of usefulness and my field for its indications have become so broad, by reason of experience and much practice, that I use it, in normal conditions, simply to relieve women of the pain and suffering of ordinary childbirth by shortening the time of labor and that fact is demonstrated when I say that I personally delivered last year 1113 women, of which 920 were delivered by version 400 being primiparæ and 520 multiparæ.

I have thought it best to describe as briefly and as fully as I can, my method of podalic version. The patient is prepared as for any major operation, shaved, scrubbed and made as clean as possible. The operator is similarly treated and then gowned, with short sleeves and long gloves reaching to the elbow.

The woman is placed upon the table and anesthetized to the stage of surgical anesthesia, then there is no resistance to the various procedures to be carried out. She is then placed in a modified Walcher position, one leg held by an assistant standing on each side, or if no assistants are available, the legs are supported on two chairs while the operator stands between them.

The bladder is emptied of all its urine, and this is very impor-

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\*Read at a meeting of the Philadelphia Obstetrical Society, November 4, 1920, as here presented. Also in modified form at the meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, September 20-22, 1920.

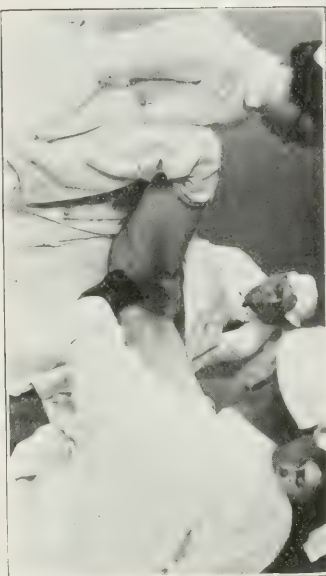


Fig. 1.—Beginning to "iron out" the birth canal with one finger.



Fig. 2.—"Ironing out" process continued with two and three fingers.

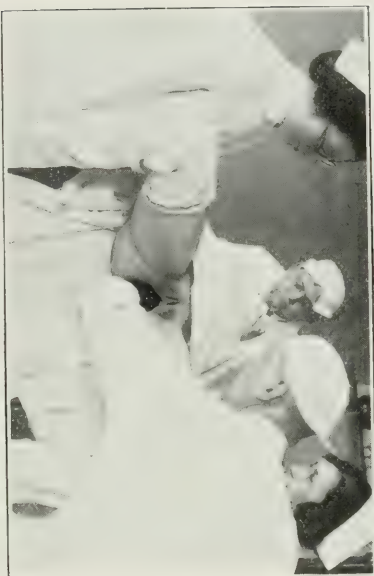


Fig. 3.—Showing finally, the whole hand introduced into the vagina.

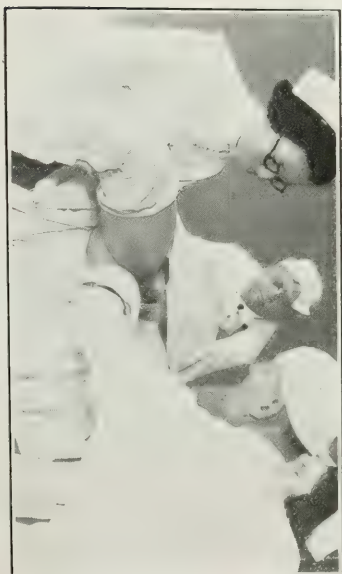


Fig. 4.—Hand and arm introduced into vagina with towel around operator's arm to protect him from escaping fluid.

tant, as many patients void and still retain a half pint and more of urine in the bladder.

The vagina and soft parts are now dilated by first putting in one finger of the gloved hand, well lubricated with green soap, and passing it up as high as the cervix and then withdrawing it with a steady, continuous and firm pressure. Then two fingers are inserted and then three fingers, and finally the closed fist until all the rugæ and folds of the vagina are thoroughly ironed out. It matters not whether the case be a primipara or a multipara, the procedure can be just as satisfactorily and completely done.

Now the cervix, which must always be obliterated or soft and easily dilatable before version is ever attempted, is gently stretched with the fingers. Then the outstretched hand and the arm is pushed high up between the uterine wall and the membranes, and the latter are gently separated all over by sweeping the fingers, of the hand up and down and around, being careful not to work too near the placenta.

Next a towel is rolled around the wrist to catch any of the amniotic fluid which might gush out when the membranes are ruptured high up. The hand is now free in the uterine cavity, the position of the child is made out and its probable size estimated, the position of the cord ascertained and the diameters of the pelvis approximated.

Both feet are now grasped between the first and middle fingers of the left hand—the left hand is always used for the version no matter what position the child is in. According to the position of the child, the toes of the feet will either look to the palm of the hand of the operator or away from it.

Now the extraction begins and both feet are brought down to the vulva and delivered together, the child's body having rotated with this onward movement.

Slight pressure is sometimes necessary at this stage to lift the head out of either iliac fossa with the right hand. Continued gentle traction is made until the knees are exposed, at which time the version is complete. Now rest for a few moments and then gently pull upon the anterior foot and lower leg until the pelvis of the child comes into view, when it will be seen that the pelvis rotates in the opposite direction and is eventually delivered in that direction. This rotation is brought about by the traction on the lower leg and the baby comes into the world with its back transverse to the pelvic outlet. No attention is paid to the cord at this time if it is free and loose, which it usually is, but if it is tight and short a clamp is placed at the umbilicus and the cord is cut, if it can't be otherwise loosened.

We now proceed with the delivery of the scapulæ which must be always thoroughly exposed and well out in view before any attempt is made to deliver the shoulder. Then the fingers and the hand of the operator are pushed well above the shoulder between the lips of the





Fig. 5.—Both feet brought outside of vagina. Note method of grasping feet by operator.



Fig. 7.—Buttocks of child being delivered by expulsive efforts of mother.



Fig. 6.—Version completed. Knees exposed.



Fig. 8.—Back of child rotated squarely across outlet.

vulva and the anterior shoulder is delivered with the upper arm. The operator now grasps the baby with his hand over the exposed shoulder and chest and rotates the child's body so that the posterior arm comes anterior and is delivered as such. Both shoulders being now delivered, the lower arms usually fall out of themselves. If, however, they remain undelivered they can be gently lifted up across the chest of the child and drawn away from the perineum under the pubic arch. (You will observe that the baby in this rotation movement is not twisted from the legs as I have seen it done.) The older method of version brought the arm down as a posterior arm across the distended perineum, which was often the cause of the extensive tears consequent upon that method of podalic extraction.

The operator now determines whether there is any loop of the cord around the neck and finding none he proceeds with the delivery, but if the cord be twisted once or twice or even three times around the neck this condition of the cord must, if possible, be relieved, by loosening it, and if absolutely necessary, it must be cut and clamped. However, usually the cord is free and no haste is called for.

The fingers of the left hand are now inserted into the baby's mouth and with the right hand gentle pressure is made upon the occiput over the pubes to aid in the flexion of the baby's head and also to direct its passage through the pelvic canal. The jaw is not pulled upon, as a fracture might result.

Up to this point no pressure from the outside has been made in the delivery, because such pressure over the head before delivery of the arms, has a tendency to push the head down, which allows the arms to go up as well as extend the chin, complications, which at all times must be avoided, and I am sure it is this pressure that makes the difficulties and dangers of other methods of version.

By this time the baby's mouth is exposed and the mucus is milked out of the throat by the fingers gently stripping the front of the neck, when the baby will begin to breathe and often cry aloud.

The head can be left in this position long enough to thoroughly dilate the perineum and vaginal structures, as no haste is indicated and finally the nose is delivered, followed by the brow in an extremely flexed condition which is further assisted by lifting the body well forward and up from the perineum.

The baby is now placed upon its right side on its mother's abdomen and allowed to remain there until the cord ceases to pulsate. The ligature is now placed around the cord and the cord is cut and a hypodermic of pituitrin 1 c.c. is given deep into the muscles of the mother. The third stage of labor can now be completed immediately if any indication exists, or the placenta can be left from 15 to 20 minutes and often it is expelled spontaneously. If not, the gloved hand can be introduced

and it can be extracted manually. The patient is now put to bed and usually with a binder.

During the past three years a number of physicians have visited me in order to witness my technic in performing a version, and it is their questions and remarks that have suggested this paper. The impressions gained from talking with them leads me still further to the belief that very few men understand the technic or the advantages of a properly performed version. This ignorance is due largely (1) to an almost complete lack of teaching of this subject in our medical schools today and (2) to an amazing amount of inactivity or want of initiative on the part of the practitioner and especially the teachers and professors of obstetrics.

The following are some of the questions put to me by visitors and others:

What are the indications for version and why do you do it? What is the condition of the cervix when you attempt version? What position does the head occupy? How far down is the head before version is attempted? Why do you bring down both feet instead of one foot? Why is the anterior arm delivered first? Why don't you hasten delivery after the umbilicus can be seen? How do you overcome extension of the head and of the arms over the head? How do you save the mother's soft parts, especially the perineum, from lacerations? Why your apparent indifference as to the child's breathing immediately after birth?

Let me answer these questions and at the same time epitomize and dwell on their importance. I also wish to point out that I do a version to eliminate the second stage of labor and thus relieve a woman of the pains and agonies of childbirth.

1. The cervix must be obliterated and the os dilated or dilatable, before version is attempted. This condition is easily determined by careful examination. The cervix need not always be entirely obliterated if it is soft and easily yields to the advancing hand.

2. The position of the presenting head is of no particular importance. A version can always be successfully performed if the presenting head can be lifted above the brim of the pelvis. Sometimes the head is so wedged in the pelvis, when the waters have drained away, that version is impossible. When this condition obtains, delivery by forceps or other means is necessary.

3. Both feet are brought down because the delivery is easiest when this is done; and, if necessary, in the interest of both mother and child, the labor can be terminated more quickly. By pulling on both feet the obstetrician distributes traction more evenly and thus secures a better dilating wedge.

Both feet, instead of one foot, should be brought down at the same time.



No attempt to deliver the arms should be made until the scapulæ are outside the vulva. The anterior arm should always be delivered first.

4. The anterior arm is delivered first because by so doing we relieve the stretching and tension of the soft parts of the mother, and permit



Fig. 9.—Anterior shoulder delivered under pubic arch.



Fig. 10.—Rotating posterior shoulder to position of anterior shoulder.

rotation of the child's body so that the posterior arm now becomes anterior.

5. I never hasten delivery after the umbilicus comes into view because experience has taught me that haste is unnecessary; that severe complications such as extension of the arms and of the head are very



Fig. 11.—Rotation of posterior shoulder completed.



Fig. 12.—Delivery of the well-flexed head.



Fig. 13.—Child placed upon abdomen of mother.



Fig. 14.—Prolapsed cord.

apt to take place when we interfere with the natural forcing powers at this particular stage of delivery.

6. Extension of the head is overcome by aiding flexion of the head with the fingers of one hand in the child's mouth, and with the other hand making gentle pressure upon the head over the pubes.

7. The perineum and soft parts of the mother are saved, first of all, by deep anesthesia; secondly, by having the patient in the partial Walcher position, which gives one good control and admits of slow and safe delivery of the head after the vagina and perineum have been previously ironed out and properly dilated.

8. I am apparently indifferent to the child's breathing immediately after birth. Experience has taught me that nearly all of the babies begin to breathe spontaneously when let alone, provided the heart is beating. Occasionally when respiration is unusually delayed a catheter is passed into the trachea. Rough handling of the baby after it is born is never tolerated.

9. During the delivery, as soon as the mouth is exposed over the perineum the baby's body is raised up to let the mucus run out of the mouth. Blue babies give me no anxiety but white babies do.

10. The operator must remember that in the delivery of the head extreme flexion is necessary and that this flexion can be best produced by placing the fingers of one hand in the child's mouth and by making gentle pressure upon the head over the pubes with the other. If extension of the head takes place notwithstanding every care, complications at once arise but in the hands of an experienced operator extension of the head does not occur or at all events is very infrequent.

11. When the chin and mouth have been delivered the mucus will run from the child's mouth and nostrils or it may be milked out by gently stroking the neck and thus many children will breathe before delivery of the head is complete. Therefore haste is unnecessary.

12. Too great pressure upon the mother's abdomen during delivery of the head should be avoided for fear of injuring the bladder or lower anterior uterine wall.

13. The after-coming head may be delivered by forceps if necessary.

14. The operator should at all times have a perfect knowledge of the position of the child *in utero* before version is attempted and an exact knowledge of this can be obtained only by introducing the hand to the fundus and exploring the uterus and the fetal parts carefully.

Men have criticized me for saying that I find posterior occipital positions in from 60 per cent to 70 per cent of my cases. It is because I examine these women many hours earlier and before rotation has taken place.

15. If the membranes have not been ruptured, it is well to separate them all around and as high up as possible from the uterine wall before rupturing them. The rupture should be made high up for the purpose of retaining as much of the amniotic fluid as possible.



16. When the knees of the child appear at the vulva, the version is complete.

17. The operator should be master of the situation at all times and with the child's chest resting in his hand he can watch the fetal heart as he can feel its pulsation in his hand. I have never broken an extremity in a living baby during version. On three occasions the humerus was broken in delivering dead babies and when haste was necessary in the interest of the mother.

18. The extreme lithotomy is not the best position for the patient when a version is performed. The modified Walcher position admits of better results by relaxing the soft parts of the mother. This position can be obtained only by having the assistance of two attendants who hold the legs one on each side or by allowing the feet of the patient to rest upon two chairs if assistants are not at hand.

19. When the child is born, it is placed on its right side across the abdomen of the mother. This position aids perhaps in the closure of the foramen ovale. The child remains upon the abdomen until the cord is tied and cut. At this point I should like to enter a protest against the too common practice of spanking or beating the baby to make it breathe, as this is unnecessary and may do harm. I rarely have to do anything except hold the baby up with its head down to allow the mucus to run out of the mouth or blow a few times upon the child's chest to establish respiration quickly. Sometimes we breathe into the child's trachea through a small catheter but not very often. In my early practice I did this more frequently but now I know that haste and anxiety in inducing the child to breathe are seldom necessary.

20. The third stage of labor may be completed by delivering the placenta manually. It is my practice, however, to administer by deep hypodermic injection into the muscles of the mother, 1 c.c. of pituitrin immediately after the birth of the child and in a very short time the placenta is expelled with very little hemorrhage.

I never bag these cases, because a natural dilatation of the cervix is desired and this is not obtained when bags are used. The dilatation and retraction of the cervix which leads to the desired obliteration begins above and is not the same as that brought about by the use of bags. Bags also displace the presenting part and predispose to prolapsed arms, a thing that happened twice last week in New York City, which I have not seen before in three months.

Now what advantages do I claim for my method of version?

1. The woman suffers no pain after the dilatation of the os has taken place. Therefore I eliminate the second stage with all its suffering and it seems to me women will not dread their confinements and will have more children.

2. The soft parts are thoroughly dilated and are not for a long time

subjected to pressure so that a relaxed, flabby vagina, and torn perineum and prolapsed bladder does not occur in our practice.

3. We see no temperature in our cases because we believe that tender tubes and ovaries, and perhaps many of them the subject of latent gonorrheal infections, are not lighted up into activity by the long pressure and bruising of the on-coming head.

4. The woman suffers no shock and therefore should be more resistant to possible infection.

5. There is no bleeding of any moment in our cases and the uterus remains contracted and in better condition after the delivery is effected. The lochia is less in amount.

6. We believe the baby's head is subjected to less compression injury than is the result after a long and tedious labor and especially after a forceps delivery. Therefore epilepsy and other cranial complications should be less common than after ordinary labors.

7. Of lesser importance but yet a justifiable consideration, the attending accoucheur is worked less, has more leisure and finds his specialty an agreeable one to practice, instead of what it is now, the bugbear of medicine.

The maternal mortality in properly selected cases should be *nil*. The maternal morbidity is no greater and I am satisfied is much less, than that in normal cases and my records and temperature charts will prove this statement. Compression injuries to the baby's head are very rare. In my experience the mutilation of the soft parts of the mother is less than in forceps deliveries or as is seen in long protracted second stage labors and in the end these patients go home in good condition, happy, and well satisfied. I have never torn the perineum through the sphincter and only rarely up to the levator, while injuries to the bladder do not occur because the bladder is always emptied before the version is started and is always lifted so high up that it is not even seen during the delivery and therefore it is not torn off from its pivotal point of attachment at the internal os or from the descending rami of the pubes and ischium.

The fetal mortality was certainly no greater than that which is attendant upon other methods of delivery. Cord complications must always be seriously considered when we speak of stillborn children. I believe the cord is responsible for the greatest number of fetal deaths. In many cases this is not recognized on account of the concealed type of prolapsus funis, when the cord is caught between the head and the brim of the pelvis and the death of the child follows from pressure upon it.

For various conditions I have delivered by version and reported, 2900 cases. I have never broken an arm or leg of a living baby—three times an arm of a dead baby was broken when haste was necessary in the mother's interest. I have never had any alarming hemorrhages



Fig. 15.—Proper position with assistants.

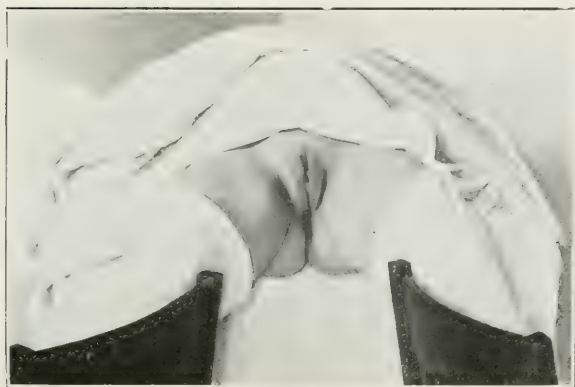


Fig. 16.—Proper position where no assistance is at hand.

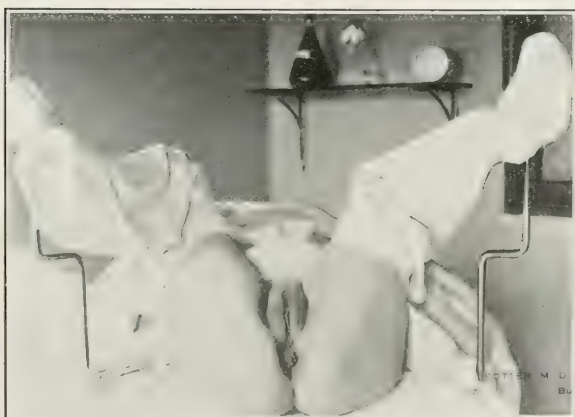


Fig. 17.—Improper position for version.



and the period of involution of the uterus in all of these cases was shorter and with less lochial flow during the lying-in period. I never had a case of postpartum hemorrhage. Convalescence too was more rapid. I attribute this favorable condition to the absence of all shock which is so often experienced by patients who go through a long second stage of labor. The uterus was not tired out neither was the delivery precipitate. Then too there was present greater strength and a better sense of well-being at the end of the puerperium.

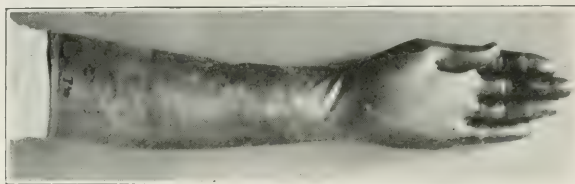


Fig. 18.—Properly gloved hand for version.



Fig. 19.—Improperly gloved hand for version.

As I have previously stated, for the year ending August 31, 1920, I personally delivered 1113 women, 920 of which were delivered by version. Of the 920 versions, 400 were primiparæ and 520 were multiparæ. There were in this total number of cases:

- 80 abdominal Cesarean sections.
- 13 footlings.
- 22 breech cases.
- 2 vaginal Cesarean sections.
- 39 instrumental deliveries.
- 2 cases were delivered by instruments on the after-coming head following version.
- There were 9 cases of twins.
- 12 cases delivered themselves before they could be reached.
- There were 10 cases that were delivered as vertex cases.
- There were 3 face cases, 2 with the chin anterior and 1 with chin posterior. It was necessary to do a craniotomy in one case.

There were 41 stillborn children, classified as follows: breech, 2; short cord, 2; hydrocephalus, craniotomy, 1; prolonged labor, faulty presentation, 1; prolapsed cord, no pulsations felt, 5; hydrocephalus, 2; hydrocephalus, spina bifida, 1; face presentation and prolapsed cord, 1; twins, premature, 4 months, 1; disproportion between child and pelvis (weighed 10 pounds each), 3; eclampsia, 1; macerated fetus, 6; monster, anacephalic type, 5; cord around legs and arm, 1; macerated fetus, specific, 1; albuminuria of mother, 1; L.O.P., 1; placenta previa, 7 months, 1; fibroid tumor, complicating labor, 1; brow, 1; marginal placenta previa at term, 1; diabetes in mother, 1; faulty position of head at term, seen in consultation, instruments had been applied, child dead, 1.

Of the complications those having to do with the cord were most numerous and seem to bear out my statement made previously that cord complications are the cause of the majority of our stillborn children.

There were 16 prolapsed cords; 10 short cords; complete knots were found in 3 cases; twisted cord was found in 2 cases; the cord was around the neck once in 37 cases, twice in 13 cases, three times in 3 cases, four times in 1 case, six times in 1 case, with a living child; once around the neck, and between the legs 4 times; twice around the neck and between the legs 2 times; cord between the legs, necessitating cutting before delivery, 5 times; cord around both legs, once.

There was one case of loose placenta and one of adherent placenta; marginal placenta previa, 7 cases; central placenta previa, 2 cases.

The largest baby was 12½ pounds, another weighed 12 pounds, 1 ounce.

There were 34 children who died in the hospital before being discharged or inside of 14 days from birth classified as follows: One congenital syphilis, aged 8 days. Fourteen convulsions, from 36 to 72 hours. These were not after difficult deliveries so I am satisfied they were not the result of cerebral or petechial hemorrhages.

One hemorrhage into and rupture of suprarenal gland—found by autopsy 4 days after birth.

Ten were bleeders living from 2 to 6 days who bled from the mucous membranes, bowels, eyes, nose, etc.

Five cases of inanition living from 6 to 10 days and the cause of these deaths I cannot explain.

Three monsters living from 2 to 3 days.

Two mothers died who had been delivered by version, one a poorly nourished patient sick with a colitis and running a temperature for a week before delivery, living 41 days and then dying from the effects of her colitis which she had had for years. Blood cultures 3 weeks following delivery were sterile. The second case was up and around the hospital ready to go home, when she developed a lobar pneumonia, from which she died four weeks after delivery.

## POTTER VERSION. THE ELIMINATION OF THE SECOND STAGE OF LABOR. A REPORT OF 200 CASES\*

BY M. PIERCE RUCKER, M.D., RICHMOND, VA.

AT THE twenty-ninth meeting of the American Association of Obstetricians and Gynecologists, Dr. Irving W. Potter<sup>1</sup> reported 500 cases of internal podalic version, most of which were done for the sole purpose of shortening labor and to avoid suffering. The paper was very adversely criticized, and the Executive Committee considered the principles laid down by the essayist so dangerous that the paper was withheld from publication in the proceedings of the association. The next year Dr. Potter reported an additional 200 cases before the same association, making a total of 700. The discussion of the second paper was scarcely less favorable. There was no criticism of the results obtained. The attack centered in the sentiment that it was unwise to interfere in cases that would deliver themselves spontaneously; that, while Dr. Potter's results were good, the adoption of Dr. Potter's teachings would lead to untold harm.

In the 700 cases reported in the two papers, there was no maternal mortality or morbidity. In fact, the mothers seemed to be better off than the average mother. There were no more lacerations than ordinarily encountered. In the 200 cases of the second paper there were eighteen stillbirths.

The Potter version must be studied from several different angles. First, can others do it with the same ease and success as Dr. Potter? Second, the effect upon the mother; third, the immediate effect upon the child; fourth, the remote effect upon the child. In order to throw light upon some of these points, I have undertaken the present study. The technic that Potter describes and very willingly demonstrates is a very simple one; one that can be carried out either in a hospital or a home. In fact, a large number of his cases are delivered in homes. The first case that I saw him deliver was in the patient's kitchen. The patient was on the kitchen table with her feet resting in two chairs. An ordinary zinc wash tub was between the chairs. A bath towel extended from beneath the patient's buttocks to the tub. The few instruments that he uses, hemostats, scissors, outlet forceps, cord tape, and rubber catheters, were laid out on a sterile towel on the kitchen drain board. He uses an elbow length glove on the left hand and an ordinary rubber glove on the right hand. The patient was deeply under chloroform. A neighbor steadied the patient's knees. He

\*Read at a meeting of the Richmond Academy of Medicine and Surgery, September 14, 1920.



lubricated the left hand with liquid soap and dilated the vagina thoroughly. More soap was poured into the birth canal, the palm of the hand acting as a trough to facilitate this. The membranes were stripped from the lower uterine segment. A towel or some convenient sterile cloth was wrapped about the forearm, and kept close against the vulva. The hand was introduced far enough into the uterus to grasp both feet. The purpose of the towel is very evident as soon as the bag of waters ruptures, which usually happens when the feet are grasped. The feet are brought down into the vulva, the version being assisted by the right hand on the mother's abdomen. After the legs are delivered, traction upon the anterior leg causes the back to rotate anteriorly. After a few moment's pause, gentle traction is made on the thighs until a scapula appears under the symphysis. It is sometimes necessary to rotate the body to effect this. Then, with a finger introduced under the pubic arch until it parallels the humerus, he delivers the anterior arm. In a similar manner he delivers the other arm. A finger of the left hand is then introduced into the child's mouth to preserve flexion of the hand, and the head is expressed by pressure on the fundus, just as one expresses the afterbirth. As soon as the face appears, he strokes the mucus out of the baby's throat. The head is then delivered very slowly. The child is laid across the mother's abdomen, and the cord is clamped and cut as soon as pulsation ceases. He gives an ampule of pituitrin immediately after the child is born and then expresses the afterbirth. What impressed me especially, was the ease and deliberateness with which Dr. Potter worked. The first case that I saw him do was a multipara, and he finished it within the classical eight minute period. Later, I saw him deliver a primipara. When he brought out the feet a loop of cord came along with them. I asked him if it were pulsating. There was absolutely no pulsation. He seemed not to worry about this, and was even more deliberate than usual when he saw me timing him. Fifteen minutes elapsed before he delivered the head, and the child breathed spontaneously three minutes later. Dr. Potter in his paper, emphasizes the importance of complete anesthesia. Dr. Reynolds gives the anesthesia in all of his cases both in the home and in the four hospitals in which he works. After having some experience with various kinds of anesthetists, I can see the importance of such an arrangement.

In the cases that I am reporting at this time, we have followed as nearly as possible Dr. Potter's technic with the exception of the routine use of pituitrin. It appeared to me unwise to use anything to cause contraction until the afterbirth had been delivered. Then too, I wanted to see whether versions predisposed to postpartum hemorrhage. In the first cases of our series we followed our usual routine of giving one dram of the fluid extract of ergot as soon as the woman recovered from the anesthesia enough to swallow. Our cases under this procedure

differed in no way from any others that were deeply anesthetized. We then adopted as a means of saving time, the routine of giving a hypodermic of ergotol or pituitrin immediately after the expulsion of the placenta.

In order to answer in a measure the criticism that the procedure described by Dr. Potter requires exceptional skill, I have included in this report the cases delivered by myself, by my associate Dr. Carter, and by the fourth year medical students under my direction. Thirty-three cases were delivered at the Spring Street Home for Girls, eighty one were private cases, delivered by myself and eighteen private cases delivered by Dr. Carter, twenty-three were cases delivered in consultation, and forty-five were students' cases.

There were three maternal deaths, one from postpartum eclampsia, one an ether death, and the third from influenza. The first death was that of a white woman, delivered in the out-patient service. She was seen the previous week at the dispensary, where it was noted that she had a funnel pelvis. No urine examination was made. When the students called me, the head had been on the perineum for two hours and she was having almost constant pains. The head was so soft and boggy that both the students and I made a diagnosis of breech presentation by rectal examination, and only after a vaginal examination did we discover our error. The fetal heart could just be heard. It was decided not to lose time necessary to send back to the hospital for forceps, but to deliver the patient by version. This was accordingly done under chloroform anesthesia. It was difficult to get the patient relaxed enough to get the head about the contraction ring, but after this was done the version and extraction was easy. The patient was left at the end of an hour in good condition, except that her blood pressure was 150 systolic, 90 diastolic. Two hours later, the visiting nurse reported that the patient had just had a convulsion. An ambulance was sent to take her to the Virginia Hospital. There was some misunderstanding, and when the ambulance arrived the patient's condition was so good that the ambulance surgeon considered it a call to a normal case, and left the patient in her home. Her convulsions increased in frequency and the patient became comatose. Finally after being unattended for eight hours from the first convulsion, she was taken to the hospital where she died the next day.

The second death was also in the student service. The patient was anesthetized by a hospital interne who had given a large number of anesthetics. I had just made an internal examination and was intent upon directing the student in his search for the baby's feet, when I noticed that the patient was extremely blue and entirely pulseless. Artificial respiration was given for three hours together with hypodermics of caffeine and strychnine. The patient's color became a

bright pink, and several times it looked as though she would recover, but there was never any palpable pulsation.

The third death was a private case who died early in January. She developed postpartum, a cough, high temperature with a few râles, nose bleed, and a leucocyte count of 13,000. Two other cases had pneumonia postpartum. One case developed malaria after delivery, and the plasmodium was found in the blood. Two of my cases showed evidences of profound shock. The first of these was an elderly woman, who had a hemorrhage from the genital tract several days before she went into labor. Her pains were slow and irregular. After she had been in labor a number of hours, I completed manually the dilatation of an almost dilated cervix, and delivered the child. In spite of ergotol and massage of the uterus, she continued to flow rather freely. The cervix was inspected, and found intact. The uterus was packed with iodoform gauze. This controlled the hemorrhage, but not before her blood pressure had dropped to 60 and her pulse had gone to 120, and the patient was complaining that she was unable to get her breath. The patient was given hypodermoclysis and the foot of the bed elevated, and in four or five hours, she seemed to be in good condition. The mother made an uneventful recovery and she and the baby left the hospital in excellent condition at the end of the usual two weeks. This was probably a case of abruptio placentaë with antepartum bleeding and a tendency to relaxation of the uterus after delivery.

The second case was seen in consultation with Dr. Blanton. She also was an elderly multipara. She had albumin and casts in her urine and a systolic blood pressure that averaged about 220 mm. of Hg. By careful treatment she was carried to term. The onset of labor was marked by a severe hemorrhage, followed by a second one several hours later. When I first saw the patient she had lost enough blood to reduce her blood pressure to 180. The cervix admitted three fingers and was almost completely covered over by placenta. Under light chloroform anesthesia, the dilatation was completed manually, and a very easy version and extraction done. The afterbirth was delivered with no difficulty, and was intact. Within thirty minutes, the patient began to feel faint and in a very short while was pulseless. She was given 300 c.c. of saline with one c.c. of adrenalin solution intravenously, and by the time the infusion was finished, had a good color and a systolic blood pressure of 125. This patient also made an uneventful recovery.

One case had infected sutures and ran a little fever for two days. Two cases had well-marked puerperal fever. Both of these had been attended by midwives before the students were called, and in one of them high forceps had been attempted by a colored physician after pituitrin had failed. Two of the cases, including the fatal one,



had eclampsia, and in six others labor was induced on account of intense toxemia. One case had an exophthalmic goiter. There were four cases of placenta previa, one of which was central. Otherwise, there were no maternal complications.

One can but be impressed with the results mechanically. Seven cases had second degree tears, and forty-six, tears of the skin and mucous membrane, in the cases that I have examined four or five weeks postpartum. I have been surprised at the remarkable integrity of the birth canal. In many of them the only indication that they have borne a child, is a slight laceration of the cervix. In one case I was unable to make a vaginal examination with two fingers. Never before have I come so near to discharging my patients in as good condition anatomically.

TABLE I  
SHOWING RELATION OF PELVIS TO INFANT MORTALITY

	NORMAL PELVIS	FLAT CONTRACTED	FUNNEL	JUSTO-MINOR	KYPHOSIS (NOT CON- TRACTED)	NOT STATED	TOTAL
Breathed spontaneously and lived at least 14 days	112	2	2	0	1	39	156
Resuscitation necessary, lived at least 14 days	9	0	0	0	0	4	13
Died in the first 14 days	8	0	2	0	0	3	13
Stillborn (not macerated)	9	2	0	0	0	5	16
Macerated	3	0	0	0	0	0	3
Total	141*	4	4	0	1	51	201*

\*One case of normal pelvis counted twice on account of twins.

The absence of infection and the lessened frequency of injuries to maternal soft parts, excite more comment, and I might say doubt, than anything else in connection with the Potter version. Yet, when one considers the mechanics of the method, in the light of anatomy and pathology, it seems very rational. Potter emphasizes the importance of limiting the number of vaginal examinations. The gloved hand, thoroughly covered with liquid soap, which is germicidal, is introduced into the vagina, and the vagina flushed with green soap. The hand is now carried up into the uterus and into the amniotic sac. The baby is delivered promptly, and the sac in which you have been working, is cast off with a flow of blood that flushes out the entire birth canal. The whole process from the introduction of the hand to the scouring effected by the delivery of the afterbirth, lasts scarcely more than twenty minutes on an average. Compare this with the routine vaginal examination early in labor. In the first place the patient is not in so good a position to observe asepsis, neither is she usually as well prepared as when you have prepared her for delivery. The examining fingers are carried through the same canal

as the delivering hand, without, however, the help of the liquid soap. What bacteria are carried up from the vagina into the cervix, are left for hours, sometimes for days. They have ample time to multiply, to penetrate the fetal membranes and invade the fetal blood vessels,<sup>2</sup> as well as the uterine muscle and blood sinuses, and to become firmly intrenched before the cleansing action of the birth of the placenta occurs. Clinical evidence supports the contention that a single vaginal examination early in labor is more liable to cause infection than any amount of manipulation, short of injury to maternal tissue, at the time of or just before delivery.

As an explanation of the comparatively few and insignificant lacerations, I submit the following: First, the mother is deeply anesthetized, so that the perineal muscles are relaxed and flaccid. Secondly, the posture, a modified Walcher position, with the thighs as close together as possible, relaxes the perineal fascia, as has been shown by Baughman,<sup>3</sup> more than any other position. Third, the vagina is thoroughly stretched and lubricated. Fourth, the aftercoming head will go through a smaller space, as was shown by Sir James Y. Simpson<sup>4</sup> years ago, in discussing the relative merits of version and forceps in contracted pelves. He states that he has often delivered easily by version heads that he could not deliver by long forceps. Fifth, the obstetrician has better control over the advance of the head.

A reference to the appended table will show the relative number of white and colored women in this series, as well as their marital condition, age, the number of children and abortions they have had previously, the blood Wassermann reaction, the character of the pelvis, the position of the child, the duration of the three stages of labor, the method of separation of the placenta, the degree of laceration of the perineum, the condition of the child at birth, its weight in pounds and its length in centimeters, and the complications encountered. The youngest patient in the series was thirteen and the oldest 43. Five of the cases were forty or more years of age. The average age was 29.1 years. The average duration of labor was: first stage 15 hours and 25 minutes, second stage 33.5 minutes, and third stage 9.9 minutes. One hundred twelve patients were primiparæ. Thirty-four cases had aborted one or more times. There is a record of Wassermann reaction in one hundred thirty-one cases. The reaction was positive four times, and seemingly had little effect on the course of labor or the welfare of the child. I encountered a flat contracted pelvis four times and a funnel pelvis an equal number of times. One patient had a marked kyphosis. Of unusual presentations, there were eighteen breech, three shoulder, and one brow. It is surprising to note the number of times the placenta separated by Duncan's method. The method of separation was not noted in thirteen histories. In the re-

TABLE II  
ANALYSIS OF CASES WITH SPECIAL REFERENCE TO NEONATAL MORTALITY

	NO. OF CASES	INFANT	MORTALITY
White	163	25	15.33%
Negroes	37	7	18.91%
Married	151	23	15.23%
Single	48	9	18.75%
Widowed	1	0	00
Parity, previous children 0	112	18	16.07%
“ “ “ 1	36	7	15.11%
“ “ “ 2	19	2	
“ “ “ 3	10	2	
“ “ “ 4	6	1	
“ “ “ 5	4	0	
“ “ “ 6	5	1	
“ “ “ 7	2	0	
“ “ “ 8	4	0	15.11%
not stated	2	1	
Previous abortions 0	158	22	13.92%
“ 1	21	6	25.00%
“ 2	10	3	
“ 3	2	0	
“ 4	2	0	
“ 5	1	0	
not stated	6	1	
Blood Wassermann negative	127	20	15.74%
positive	4	1	25.00%
Pelvis, normal	140	19	13.57%
flat contracted	4*	2	50.00%
funnel	4	2	50.00%
kyphosis	1	0	
not stated	51	8	15.68%
Position, L. O. A.	90	12	13.33%
R. O. A.	25	3	12.00%
R. O. P.	50	7	14.00%
L. O. P.	11	1	9.09%
occiput unspecified	2	0	
brow	1	0	
breech	18	3	16.66%
shoulder	3	3	100.00%
Separation of the placenta, Duncan	125	19	15.20%
Schultze	62	10	16.12%
Condition of the infant, breathed spontaneously	164	8	4.87%
resuscitated	18	6	33.33%
stillborn (not macerated)	16	16	
macerated	3	3	
premature	15	11	73.33%
postmature	14	10	71.42%
enlarged thymus	2	2	
heart disease	1	1	
hydrocephalus	1	1	



TABLE II—CONT'D

	NO. OF CASES	INFANT MORTALITY
Maternal complications, tuberculosis	1	0
influenza and pneumonia	3	0
prolapsed cord	3	2 66.66%
placenta previa	4	1 25.00%
ablatio placentæ	1	0
post partum hemorrhage	1	0
puerperal fever	3	0
toxemia of pregnancy	4	1 25.00%
eclampsia	2	0

\*Refused to go to the hospital.

maining 187 cases the separation was by the Duncan method in 125. This is probably due to two factors. Pressure on the fundus in delivering the head likely causes a partial separation of the afterbirth, and the anesthetic, by lessening the uterine contractions in the third stage, may interfere with the usual mechanism of separation of the placenta.

In order to judge the immediate effects upon the child, it is necessary to review the results obtained by other methods and in other clinics. DeLee in his textbook states that over 4 per cent of children died during birth, and quotes Schultze to the effect that 5 per cent of the children are stillborn and 1.5 per cent die very shortly after birth, the result of the trauma of labor. "A large percentage—how large it is impossible to say—is more or less injured, and this, too, in so-called normal delivery. Any one performing autopsies on newborn children will be struck by the frequency of hemorrhages, punctate and larger, in the brain, in the larger ganglia, along the sinuses and sutures. It is certain that such extravasations leave scars, perhaps minute, in the cerebral structures, which may explain some cerebral symptoms later in life." The investigation of the infant mortality of Brockton, Mass., a town chosen for its homogeneousness of population and better-than-average living conditions, by the National Children's Bureau,<sup>5</sup> shows that there were 3 per cent of stillbirths and a mortality of 96.7 per thousand of infants born alive, of which one-third was in the first week of life. Holt<sup>6</sup> states that 25 per cent of the infant mortality occurs in the first month, 11.09 per cent in the first week and 9.64 per cent in the first day. Alcohol, vice, syphilis, and some forms of inherited disease are factors of considerable importance, as well as malformations of heart, intestines and brain, and accidents of birth. Holt and Babbett<sup>7</sup> have studied the records of 10,000 deliveries in the Sloane Hospital for Women and give the following table:

Abortions (less than 37.5 cm. in length)	253
Stillbirths (over 37.5 cm. in length)	429
Living births	9318
Deaths in the first 14 days	291

In the Columbia Hospital<sup>8</sup> in Washington in 10,533 confinements there were 1339 fetal deaths. Coming closer home, we find that in 1918, the last year for which there is available a published report of the Health Department, there were in Richmond 3848 births, 236 stillbirths, and 181 deaths of infants in the first two weeks of life. In other words 6.1 per cent of the infants born in Richmond were stillborn and 4.7 per cent died in the first fourteen days. In the past three sessions there have been 887 deliveries in the out-patient service of the Medical College of Virginia. Of these, 101 resulted in stillbirths, and twenty babies died in the first ten days, a neonatal mortality of 13.6 per cent. The large fetal mortality is explained by the fact that the service is almost entirely among negroes. It is a well-known fact that the infant mortality in the colored race is excessive.

In the two hundred deliveries under consideration there were three sets of twins. In two of the twin cases only the second child was delivered by version. In other words, there were two hundred and one infants that properly come under our consideration in studying the effect of version upon the infant. It should be borne in mind that this series includes most of the difficult cases that I have seen in the past fifteen months. For instance, labor was induced four times for profound toxemia, and in five cases for antepartum hemorrhage. An analysis of the infant mortality will show that with few exceptions, the death cannot be attributed to the method of delivery. Two of the infants were so premature as to be nonviable, weighing 1.5 and 2 pounds and measuring 30 and 32.5 cm. in length. Ten others were premature, according to the standards set by Holt and Babbett, weighing less than five pounds or measuring less than 46 cm. In fourteen cases it was known that the child was dead before delivery was attempted and the version was done in the interest of the mother's soft parts. Two were cases of prolapsed cords in which all pulsation had ceased. Three feti were macerated. Three were neglected shoulder presentations. In two cases of twins the mother had given birth to the first child which was stillborn, and version was done on the second. In three cases the fetal heart had stopped before any attempt was made to deliver the patient. Craniotomy was done twice, both times on dead babies. The first time it was done on account of a marked disproportion between head and the pelvis, and the second time to get the head through a rigid, half-dilated cervix in a case of placenta previa with continued bleeding. There were three other

stillbirths, but in each of these the fetal heart was beating when the operation was begun.

Two cases showed at autopsy a markedly enlarged thymus, and no other lesion. One child, that died on the day of delivery, had extensive vegetations on both mitral and tricuspid valves. This child's mother had a very severe attack of tonsillitis about six weeks before delivery. There was one hydrocephalic fetus in the series, which lived about an hour. One placenta showed a large red infarct. The infant in this case was premature and died on the second day. One premature child died on the eighth day after being badly chilled. Another premature child was born of a syphilitic mother, but at autopsy showed no evidence of syphilis. In one case labor was induced prematurely on account of toxemia of the mother. The child weighed four and a half pounds and died on the second day. One child presented an angioma of the scalp and although apparently at term, was greatly undersized. One infant, delivered after a dry labor, had an extensive intracranial hemorrhage.

This brings us to the class of difficult deliveries, from one cause or another. The first of these was that of a colored woman. Although she had a normal pelvis, I had great difficulty in delivering the shoulders. It was one of my early cases, and I had not learned the knack of rotating the child's body to bring a scapula under the symphysis. I believe now that I would have no difficulty with such a case. Another case caused us great difficulty on account of poor anesthesia. Dr. Carter was doing the version and I was giving the anesthetic. The patient was greatly excited. The house had caught on fire from an oil stove and the fire apparatus, police patrol, and a Saturday night crowd had greatly upset the patient. When the excitement had subsided, and we had the patient back in the house, I was unable to get her relaxed, either with chloroform or ether. The version was on that account very difficult. I believe, now in looking back to this case, it would have been better to have delivered her with forceps. In another case the difficulty was caused by a funnel pelvis and the delivery should have been done with forceps. In three cases the dystocia was caused by large overdue babies. Two of these measured 58 and 60 cm. and the third was described as "tremendous," but was not measured. The ideal treatment for these cases would have been to have induced labor at the expected time of confinement. This was suggested to one of the patients, but was refused. As long as these patients waited until they went into labor spontaneously, it is open to question whether any other method of delivery other than Cesarean section, would have given better results.

In judging the Potter version from the standpoint of the infant, there is a great difference whether the operation is done at the end of the first stage of labor, or later, when some method of delivery is im-



perative. The difference in ease and results reminds one of the difference between elective Cesarean section and section done as a last resort. There were thirty-nine cases in which the second stage lasted for thirty minutes or more. Seven of these infants died, 18.2 per cent. In addition to the fatal cases, one infant had to be resuscitated. We can study the same factor from a different angle by separating the cases into the various services. Those at the Spring Street Home, with three exceptions, fall within the elective group. One of these came into the home in labor and was delivered of a premature baby and a placenta that contained a large red infarct. The second exception was a girl who refused induction of labor at the time she counted to be confined. She went a month over her time, and was delivered of a ten pound baby 58 cm. long. The third exception was a shoulder presentation, who refused bags for dilation of the cervix. The shoulder was jammed down into a hard unyielding cervical canal and the neck stretched out, until the baby died. The only other death at the Spring Street Home was that of a hydrocephalic fetus. Yet, with these cases included, the mortality in the 33 cases is the lowest of any other group, i. e., 12.1 per cent. My next group in electability is that of my private patients. Most of these, especially the earlier ones, required some indication, usually that of severe pain or fatigue, before giving their consent for intervention. In this group the mortality, irrespective of maturity is 14.8 per cent. Dr. Carter's cases, eighteen in all, were less inclined to give their consent for a version, and his mortality is 16.66 per cent. The consultation group of twenty-three cases, usually presented some of the well-recognized indications for rapid delivery. The mortality in this group is 17.4 per cent. The fifth group, or the student cases, is composed very largely of negroes, who have to be nearly dead before they will consent even to an anesthetic. The fetal mortality here is 17.55 per cent.

It is yet too early, of course, to judge of the remote effect upon the child, as my oldest case is only about 15 months of age. The shortening of the second stage is in line with the movement to reduce the number of head injuries. Arthur Stein<sup>9</sup> in 1917 in a paper entitled "The Influence of Labor on the Brain Development of the Child," says: "To delay the application of the forceps, as is the rule of many obstetricians, until the fetal heart sounds become weak and inaudible, means that irreparable damage has often already been done to the infant's brain. In the interest of the child, unduly protracted births should be terminated by judicious intervention." Dr. Frederick Peterson, in discussing this paper, says that the chief cause of palsies occurring during parturition was tedious labor with resulting intracranial hemorrhages. The application of forceps in tedious labor did less injury than the long-continued compression. What is true of palsies, he believes is also true of a number of cases of epilepsy, and the three degrees of

defective mind, namely, feeble-mindedness, imbecility, and idiocy. For some time, it has been my practice, in the interest of the child, to interfere in the second stage of labor whenever there is the least hesitation in the progress of the head. In other words with the use of forceps, I have been shortening more and more the second stage of labor. Potter, with his version, has gone a step further, and has practically eliminated the second stage.

#### CONCLUSIONS

1. The Potter version can be taught to students. It is easier to teach than the use of forceps.
2. It protects the maternal soft parts against undue injuries.
3. In the interest of the child, it should be done gently and deliberately.
4. A competent anesthetist is of prime importance, especially in those cases in which the membranes have ruptured early.

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THE ADVANTAGES AND DISADVANTAGES OF THE TWO-  
FLAP LOW INCISION CESAREAN SECTION, WITH A  
REPORT OF EIGHTY-THREE CASES DONE BY  
FIFTEEN OPERATORS\*

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THE material upon which this paper is based consists of eighty-three cesarean sections, done according to the technic which I first described in the *American Journal of Obstetrics*, February, 1919. As may be recalled this procedure differs from the classical operation in that the uterus is incised in the lower segment, and an extraperitoneal closure of the uterine incision is effected by utilizing two previously prepared flaps of peritoneum.

Brief notes of the eighty-three cases are recorded in Table I. In addition to the name of the operator, these notes give the duration of labor, the number of hours that elapsed between the rupture of the membranes and the time of operation, and the number of vaginal examinations made during labor. As may be observed, most of the operators employed this technic in cases which would have been considered very poor risks for the classical cesarean section. In fact only twelve of the eighty-three operations might be considered elective. The remainder were done either after an efficient test of labor, or vaginal manipulations offered a distinct contraindication to the use of the Snger operation.

In seventy-four of the eighty-three reports studied, sufficient data were furnished to enable me to show graphically the three factors which usually are considered in the study of morbidity and mortality following cesarean section.

Figure 1 is a graphic representation of the duration of labor. Twenty-three operations were done either before labor or within fifteen hours of its onset. The remainder, or fifty-one of the seventy-four, had been in labor fifteen hours or more.

The condition of the membranes at the time of operation is shown in Figure 2. They were intact in 21 cases, and ruptured in 53. More than ten hours had elapsed between the rupture of the membranes and the time of operation, in 33 cases.

Figure 3 shows the number of vaginal examinations. Only 25 of the 74 patients had not been examined vaginally before operation.

Notwithstanding the presence of these factors which greatly increase the risk of cesarean section, only 3 mothers died. The gross mortality

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in this series therefore is 3.6 per cent. When we consider the fact that only 12 operations were elective procedures, this mortality is exceptionally low. One of the deaths was due to postpartum hemorrhage two hours after delivery. This patient had an atonic uterus after a prolonged labor. Septicemia was responsible for the second

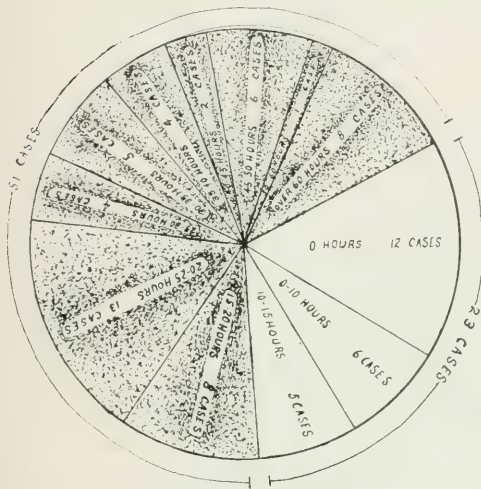


Fig. 1.—Graphic chart showing duration of labor. Shaded area over 15 hours; unshaded, under 15 hours.

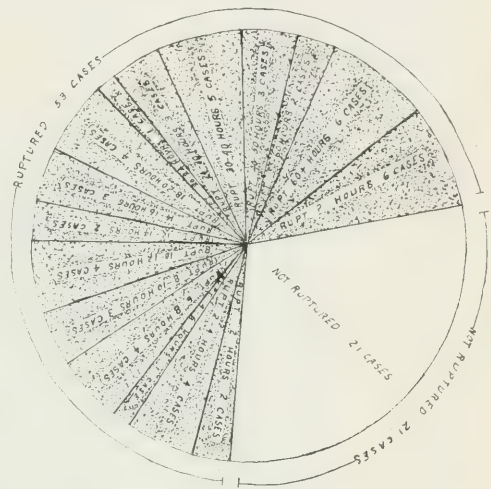


Fig. 2.—Shows condition of membranes. Shaded area, ruptured; unshaded area, not ruptured.

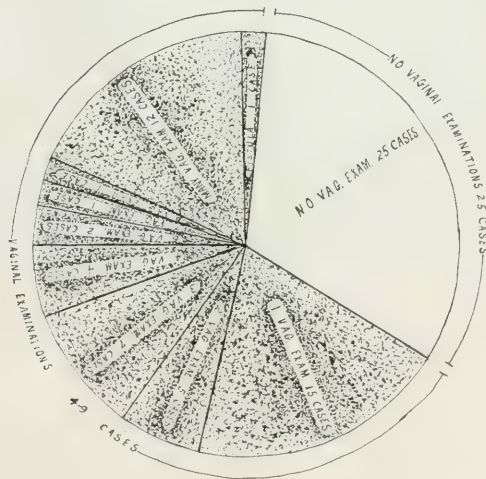


Fig. 3.—Number of vaginal examinations. Shaded area, vaginal examinations; unshaded area, no vaginal examinations.

one. A blood culture on the fifth day showed hemolytic streptococci. The third death occurred on the twelfth day, as a result of peritonitis, which in all probability was due to the transmission of infection through the lymphatics. Only two deaths from infection, therefore,

occurred in the 71 "potentially infected" cases, a mortality from infection of 2.8 per cent in this class of cases.

The anterior surface of the pelvic viscera removed at autopsy from the case which died of peritonitis, is shown in Figure 4. The large adhesion (A) covered the scar of a previous cesarean section. The double flaps were firmly adherent (B) over the site of the incision in the uterus and prevented the escape from the uterus of infected material when the uterine wound broke open. The absence of adhesions over the site of our incision is strikingly contrasted with the presence of dense adhesions over the previous high cesarean wound. Areas on



Fig. 4.—Uterus removed at autopsy 12 days after operation. Anterior surface showing (A) omental adhesion which was due to previous high Cesarean section. (B) Firmly united flaps which sealed the incision in the lower segment. (C and D) Point through which infection probably reached the peritoneum.

the broad ligaments (C) and (D), show the points through which the infection travelled from the uterus to the peritoneal cavity. The clinical picture, as well as the autopsy specimen, was similar to that seen in peritonitis complicating puerperal infection after delivery through the natural passages.

The original incision in the anterior wall of the uterus (A—B) Figure 5, was open throughout its entire length, while the adherent peritoneal flaps and bladder prevented a communication between the interior of the uterus and the peritoneal cavity. The lower angle of

the wound (B) is so near the external os that drainage of the anterior parametrium through the cervix and vagina is possible when the uterine wound breaks down.

The classical, conservative cesarean section, because of its technical simplicity and the excellent results which have followed its use in properly selected cases, is regarded almost universally as the standard method of suprapubic delivery. The advantages of any new procedure over this accepted technic, must, therefore, be definitely proved and

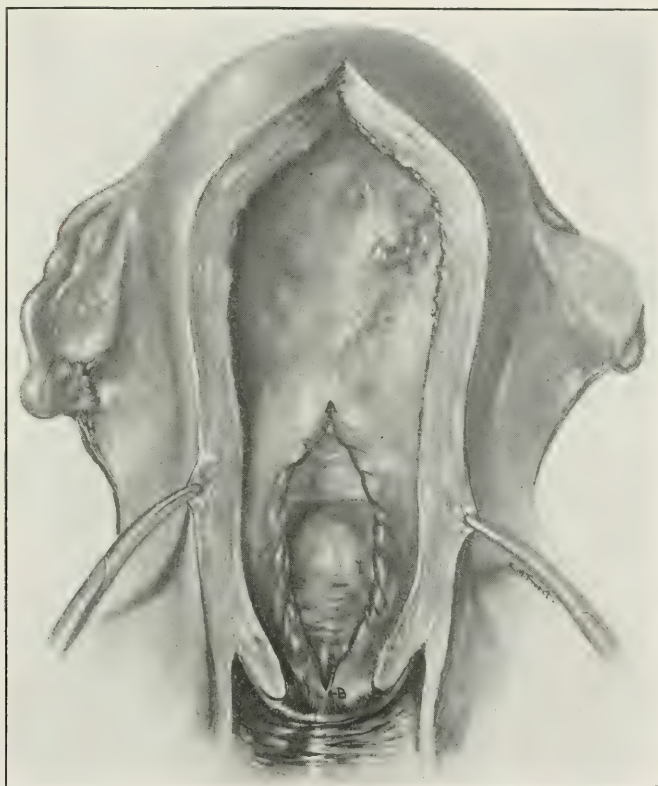


Fig. 5.—Posterior wall incised, showing site of operations. The uterine wound *A* to *B* broken down throughout its entire length. Bladder and adherent flaps prevented contamination of peritoneal cavity when the uterine wound broke open.

greatly outweigh its disadvantages if such a procedure is to survive the enthusiasm which attended its introduction. A considerable experience with the classical operation and the Krönig technic enables us to compare the advantages and disadvantages of the two flap low incision cesarean section, with those of the accepted procedure.

#### EXPOSURE OF THE FIELD OF OPERATION

The field of operation is more easily exposed when the classical operation is done. In our procedure the difficulty of exposure is less



than that encountered in the usual pelvic operations and is greatly diminished by the use of the Trendelenburg posture whenever the bladder reflection is below the level of the lower angle of the abdominal incision. As this area rises with the progress of labor the field of operation is easily exposed in those cases done some hours after the onset of labor.

#### TECHNICAL DIFFICULTIES

The dissection of two flaps of peritoneum makes our technic somewhat more difficult. It likewise might be inferred that injury of the bladder is possible. In the hands of one familiar with abdominal hysterectomy this added technical difficulty should be quite insignificant. (Because of the occasional need for hysterectomy immediately after cesarean section, the latter operation should not be undertaken by those who are not capable of doing the former.)

#### EXTRACTION OF THE CHILD

Section through the fundus of the uterus permits easy extraction of the child. If the presenting part is not fixed in the pelvic brim, the same may be said for the low procedure, provided an ample incision is made. Preliminary disengagement by rectal or vaginal manipulation, or the use of forceps, will facilitate delivery in the difficult cases. Since the incision is in the lower segment, no great haste is required for the delivery, after entering the uterine cavity. The risk to the child, therefore, is not increased by the employment of our technic.

#### CONTROL OF HEMORRHAGE

In the low operation the placental site is encountered much less frequently than in the high. The former as a result is accompanied by less hemorrhage. Sampson's work shows the area incised in the two flap low incision technic, to be supplied by the terminals of the smaller arcuate arteries. If the midline is followed, very little hemorrhage should occur. This area is much less vascular than that incised in the Sanger operation as is shown in Sampson's x-ray pictures of an injected uterus.

Whenever it is impossible to secure proper contraction of the uterus after the delivery of the placenta, and hysterectomy is indicated for the control of hemorrhage, this operation can be better and more easily done after our procedure, since the lower segment is already exposed and the bladder flap has been previously dissected, an advantage of inestimable value, as in these cases the condition of the patient usually is poor and demands a quick hysterectomy.

Postpartum hemorrhage should not occur after a low cesarean section because postpartum relaxation may be detected and treated as

easily as after a spontaneous delivery, since the abdominal dressings are wholly below the umbilicus and permit the nurse to feel the uterus at all times.

#### ABDOMINAL ADHESIONS

Following the classical operation adhesions between the uterine incision and the omentum, intestines, and abdominal wall frequently occur. While we have not opened the abdomen of any of our patients who have been delivered by our operation and as a result cannot prove the absence of adhesions, it would seem that the low incision plus the better peritonization, should be followed by fewer adhesions. Bimanual examination one month after operation invariably has shown the uterus to be in excellent position and freely movable, a condition which points towards the absence of adhesions.

#### POSTOPERATIVE CONVALESCENCE

Because of the location of the field of operation the intestines are seldom seen and never disturbed when our technic is employed. Troublesome complications are usually absent. In fact, the convalescence is quite like that which follows a prolonged labor.

#### STRENGTH OF THE UTERINE SCAR

In the few cases that have returned for delivery after a previous low cesarean section, the old scar showed no evidence of weakness. The incision is through the same tissues cut in a vaginal hysterectomy and since we have noticed no ruptures following that operation, it is reasonable to assume that the scar in the lower segment is fully as strong as that in the upper. From the fact that the lower segment is passive, it would seem that better union should occur in this region. If, as suggested by Finlay and others, rupture of a previous cesarean scar is influenced by the implantation of the placenta over the site of the previous incision, a scar in the lower segment below the usual level of the placental site is less liable to be weakened by the erosive action of the villi.

#### DURATION OF THE OPERATION

When our technic was first employed, fully one hour was necessary for the completion of the operation. Greater familiarity with the details has reduced this period to thirty minutes in some cases. Since the classical cesarean section can be completed in from 15 to 20 minutes, the advantage in this respect unquestionably belongs to the latter. If the operator lacks dexterity, or the condition of the patient is such that the addition of a few minutes to the duration of the operation is detrimental, the element of time must be considered. The average surgeon, however, will not regard the extra few minutes re-

quired by a more perfect technic, as a serious disadvantage, when the patient's condition is good.

#### PROTECTION AGAINST PERITONITIS

Peritonitis following cesarean section is the result of one or more of the following factors: (1) A faulty aseptic operative technic. (2) The "spilling" of contaminated amniotic fluid. (3) Extension of a uterine infection through the lymphatics. (4) The transmission of virulent material through an infected uterine wound, which has developed in the course of a puerperal infection. While the first three modes of infection are possible, *the usual source of peritonitis is through the uterine wound*, and the clinical course is that of a puerperal infection followed by a sudden development of peritonitis due to the leakage of pus into the peritoneal cavity.

Our operation, by placing the incision in the lower segment and doubly sealing it with flaps of peritoneum, offers a two-fold barrier against the usual mode of extension of infection from the uterus to the peritoneum. The greater part of the uterine wound sinks into the pelvis immediately after its closure. Should infection extend through this wound, we may anticipate localization in the pelvis, rather than contamination of the whole peritoneal cavity. In addition to the advantage gained by the more favorable location of the incision, the double flaps offer an added protection. Within a short time after operation, these flaps become adherent and make the wound extraperitoneal. In the event of infection, they are sufficiently united by the time that the uterine wound breaks down, to protect the peritoneal cavity from contamination. Infection is thereby limited to the subperitoneal tissues from which drainage occurs spontaneously, either through the lower angle of the abdominal wound or through the separated edges of the uterine wound into the cervix and vagina.

The transmission of infection through the lymphatics or by the spilling of contaminated amniotic fluid is not avoided by the two flap low incision cesarean section. However, since these are the least frequent sources of peritonitis, the mortality following the procedure advocated in this paper will be considerably lower than that following the Snger operation in potentially infected cases.

#### SUMMARY

The shorter duration of the operation, the ease of exposure, the fewer technical difficulties and the less troublesome delivery of the child, are points in favor of the classical operation, and may be regarded as disadvantages of the double flap low incision section. These disadvantages, however, scarcely warrant consideration if further experience with our procedure continues to show that it offers better protection against hemorrhage, peritonitis and adhesions, and is followed by an earlier convalescence and less risk of rupture during a subsequent pregnancy.



TABLE I

HOSPITAL NUMBER	PATIENT'S INITIALS	OPERATOR	HOURS IN LABOR	MEMBRANES RUPTURED IN HOURS	VAGINAL EXAMINATIONS	PUERPERIUM
L.I.C.H.						
1918						
6374	R. W.	J. O. Polak	27	6	3	febrile
6467	V. P.	A. C. Beck	5	0	0	afebrile
1919						
71	A. S.	J. O. Polak	64	18	1	afebrile
858	L. S.	A. C. Beck	48	?	0	afebrile
1151	S. J.	J. O. Polak	13	0	0	afebrile
1403	L. E.	J. O. Polak	4	0	0	afebrile
1831	P. S.	J. O. Polak	13	0	0	afebrile
2120	S. P.	J. O. Polak	4	0	0	afebrile
3130	M. B.	J. O. Polak	0	14	1	afebrile
3297	I. P.	J. O. Polak	0	0	0	afebrile
3326	R. G.	J. O. Polak	0	48	1	infection
3777	M. F.	J. O. Polak	0	48	0	febrile
4167	E. L.	J. O. Polak	48	?	Bag	afebrile
4301	R. B.	J. O. Polak	36	36	1	infection
4476	K. R.	A. C. Beck	48	48	1	afebrile
5239	A. T.	A. C. Beck	36	36	1	febrile
6085	L. W.	A. C. Beck	31	3	0	afebrile
6280	H. B.	A. C. Beck	10	0	0	afebrile
6282	H. B.	J. O. Polak	6	3	fistula	infection
6759	L. W.	J. O. Polak	24	0	0	febrile
6831	F. S.	J. O. Polak	29	72	1	infection
L.I.C.H.						
1920						
311	M. S.	W. A. Jewett	24	18	4	afebrile
782	R. K.	J. O. Polak	0	0	0	afebrile
902	C. L.	T. S. Welton	24	20	many	febrile
910	J. B.	W. P. Pool	24	60	many	febrile
919	A. K.	J. O. Polak	26	6	1	febrile
1348	A. F.	A. C. Beck	17	12	0	afebrile
1427	E. M.	A. C. Beck	55	50	0	afebrile
1862	R. M.	A. C. Beck	68	32	4	febrile
2095	Y. H.	J. O. Polak	36	36	0	febrile
2265	E. G.	A. C. Beck	24	6	0	febrile
2320	S. V.	J. O. Polak	0	0	0	afebrile
2402	G. F.	W. P. Pool	20	10	3	febrile
2460	L. B.	J. O. Polak	0	0	0	afebrile
2614	A. F.	A. C. Beck	24	4	0	afebrile
2757	A. K.	J. O. Polak	26	24	1	afebrile
2886	D. S.	A. C. Beck	72	14	arm pro- lapsed	febrile
2973	S. L.	R. M. Beach	70	72	6	febrile
3124	V. M.	J. O. Polak	0	0	0	febrile
3305	G. N.	G. Gibson	48	60	many	febrile
3692	J. K.	J. O. Polak	17	0	1	febrile
3877	P.	A. C. Beck	72	18	16	febrile
4340	B. F.	A. C. Beck	16	10½	0	afebrile
....	M.	W. A. Jewett	33	9	2 for- ceps	febrile
J. H.						
53373	R. S.	L. S. Schwartz	48	36	3	infection
54175	E. M.	L. S. Schwartz	29	72	1	infection

TABLE I—CONTINUED

HOSPITAL NUMBER	PATIENT'S INITIALS	OPERATOR	HOURS IN LABOR	MEMBRANES RUPTURED IN HOURS	VAGINAL EXAMINATIONS	PUERPERIUM
56430	R. S.	L. S. Schwartz	12	12	many	afebrile
57889	I. B.	L. S. Schwartz	64	61	1	infection
58536	R. S.	L. S. Schwartz	24	0	many	infection
58967	S. S.	L. S. Schwartz	18	?	many	afebrile
59063	M. R.	L. S. Schwartz	24	0	many	febrile
W. H.						
17138		T. S. Welton	0	0	many	febrile
17598		T. S. Welton	42	24	many	febrile
G. H.						
12626		T. S. Welton	72	?	6	afebrile
12842		T. S. Welton	32	7	0	febrile
12877		T. S. Welton	24	10	3	febrile
12950		T. S. Welton	32	24	many	febrile
14071		T. S. Welton	16	9	2	febrile
14158		T. S. Welton	36	10	2	afebrile
14518		T. S. Welton	0	0	many	afebrile
14612		T. S. Welton	72	50	many	febrile
B. H.						
	J. H.	Harold Bailey	24	1½	3	febrile
	B. K.	Harold Bailey	17	8	3	febrile
	J. P.	Harold Bailey	0	0	1	afebrile
S. H.						
9890	M. B.	W. A. Jewett	21	12	7	febrile
C. L. I.		J. B. De Lee	0	?	0	afebrile
L.I.C.H.						
1920						
5712	R. H.	A. C. Beck	20 plus	15	2	afebrile
5621	D. B.	H. B. Matthews	46	?	0	febrile
....	B.	A. C. Beck	40	18	4	febrile
....	M. E.	E. B. Piper	24	0	5	febrile
1459	L. R. R.	C. S. Fleming	18	3	2	febrile
1543	T. J.	C. S. Fleming	8	0	3	febrile
1732	F. X. F.	C. S. Fleming	10	2	1	afebrile
2410	A. W. P.	C. S. Fleming	24	4	2	afebrile

3 cases by .....John Mc. Glynn ....All unsuitable for the classical operation.  
 6 cases by .....Richard Norris .....All unsuitable for the classical operation.

The author is indebted to the following colleagues for permission to include their cases in this report:—namely, Drs. H. C. Bailey, New York (3 cases); R. M. Beach, Brooklyn (1); J. B. DeLee, Chicago (1); C. S. Fleming, Fairmont (4); C. Gibson, Brooklyn (1); W. A. Jewett, Brooklyn (3); H. B. Matthews, Brooklyn (1); J. O. Polak, Brooklyn (23); W. P. Pool, Brooklyn (1); E. B. Piper, Philadelphia (1); L. S. Schwartz, Brooklyn (7); T. S. Welton, Brooklyn (11).

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(For discussion, see p. 636.)

## A CRITICAL STUDY OF 270 CASES OF DRY LABOR\*

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EVERY practitioner of obstetrics has in his mind an indictment of "dry labor." The laity shares this prejudice. The writers of textbooks frame their charges in no uncertain tones. Jewett says: "If by mischance early rupture of the membrane has occurred and the waters have drained away, such labors are proverbially liable to be of long duration and prejudicial to mother and child." Cragin, in his textbook, page 209, says: "Sometimes rupture of the membrane occurs several days or even weeks before the onset of labor, but as a rule labor pains begin within twenty-four hours. Several cases have come under my observation in which, after the escape of liquor amnii, the long pressure upon the child and the entrance of air to the amniotic sac has apparently caused the death of the child and infection of the mother. It is my custom to start the induction of labor in a patient whose pains do not begin in twenty-four hours after the rupture of the membrane." This was a standing rule at the Sloane Hospital at the time when the authors were residents there.

Dr. Lee states that "when the bag of waters ruptures before labor, especially in primipara, these are called dry labors and are usually long, tedious, and painful. Operative interference is often necessary in dry labors."

Wright states that "the so-called dry labor is, in a large proportion of cases, a protracted labor, nearly always accompanied by serious symptoms and frequently followed by disastrous results. Dangers to the mother are: exhaustion from long-continued pain, with tetanic contraction of the uterus, rupture of the uterus, laceration of the cervix, vagina, pelvic floor and perineum; various forms of fistulae; post partum hemorrhage, pulmonary thrombosis, septicemia. The dangers to the child are chiefly asphyxiation and meningeal hemorrhage."

Peterson: "Dry labor is attended with a notable increase in the maternal and fetal hazard."

Edgar in his textbook on Obstetrics says that "premature rupture is not necessarily due to any intrinsic peculiarity of the membrane, but to anomalous conditions elsewhere (contracted pelvis, shoulder presentation). A certain proportion is thought to be of endometric origin. Early rupture of the membranes is of frequent occurrence but the condition is not invariably dystocic, because the amniotic fluid

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\*Read by invitation at a meeting of the Buffalo Academy of Medicine, January 18, 1921.



does not necessarily all escape. When it is completely evacuated, the dystocic condition known as 'dry labor' develops. The loss of the water wedge before the completion of dilatation brings the head of the fetus in direct contact with the cervix. This tends to induce a tetanoid action of the uterus and works injury to the cervix. The latter becomes greatly elongated and its anterior lip often edematous. Laceration is very common. Compression of the fetal head causes a tendency to asphyxia and intracranial hemorrhage. The tetanoid action of the uterus combined with the edematous cervix retards the first stage of labor and exhausts the mother. Premature rupture is greatly dreaded in anomalous presentations and contracted pelvis,—conditions under which it is especially prone to occur. In such cases it contributes a further element of dystocia."

Williams in his textbooks, states concerning dry labor: "This accident occurs occasionally in primipara and not infrequently in multiparous women before the onset of uterine contractions and gives rise to what is designated as 'dry labor,' which is usually unduly prolonged and very painful. The delay is due in great part to the absence of the hydrostatic action of the bag of waters, in consequence of which the changes in the cervix must be brought about almost entirely by the presenting part, \* \* \* a dilating wedge of imperfect shape and consistency. This complication is usually not so serious in multiparous as in primiparous women, since in the former, labor, as a rule, sets in within a short time of the discharge of the liquor amnii. Occasionally, however, days, and in rare instances even weeks, may elapse before it occurs. \* \* \* The premature opening of the amnion greatly increases the danger of intrapartum infection."

Hirst: "If the membranes are too thin, they may rupture prematurely, and this gives rise to what is called a 'dry labor,' in which the birth canal must be dilated by the hard, unyielding presenting part instead of by the bag of waters. Such labors are longer and more painful than the average and there is greater likelihood in them of lacerations of the cervix and a more frequent demand for \* \* \* forceps."

The question thus not infrequently arises as to the duty to the patient with membranes ruptured, not in labor, or to the patient with membranes ruptured and in labor, when progress is slow and the cervix incompletely dilated. Does the drained uterus add material risk to the child? Can the danger from cord or body pressure be lessened by active interference? What is the increased liability to uterine infection from access of air to the drained uterus? From the lengthened labor? Does interference such as the use of the bag or bougie improve the results? To what extent is operative termination of these labors necessary?

To the authors it has seemed that the intensive study of cases of dry

labor might be of value in furnishing a definite answer to some of these questions. For this analysis, a carefully kept record of a series of two thousand cases delivered at the Woman's Hospital was used. From these were selected all cases in which the membranes had ruptured twelve hours before delivery and in which the child had an intrauterine development of more than six and a half months. As it is recognized that certain women whose labors start with ruptured membranes, with a dilated and dilatable cervix, have an expeditious labor, such cases were ignored.

From the two thousand histories there were collected two hundred and seventy cases of prematurely ruptured membranes in women with viable infants, in which the rupture occurred at least twelve hours before delivery. This gives us an incidence of clinically significant dry labor cases of 13.5 per cent. The proportion of primigravida was somewhat more than that of multigravida. This is in marked contrast to the general hospital ratio of five primiparæ to four multiparæ, showing a somewhat greater tendency to dry labor in primiparæ. It is possible that these figures indicate merely a greater probability of protracted labor in primiparæ when premature rupture occurs.

The most constant factor in the causation of dry labor seemed to be deformities of the pelvis, of which there were 7— per cent of the whole. It is believed that a more careful study of the cases would have demonstrated a still larger proportion of pelvic abnormalities, as 39 per cent of the multiparæ gave a history of previous complicated labors. Four had had previous stillbirths. It seemed impossible to get any definite data as to the thinness of membranes or as to any pre-existing endometrial abnormality. Three of the cases were partial placenta previas, which might account for an irregularity in the tensile strength of the membranes.

Premature labors were 10 per cent of the whole, but as two-thirds of these were preceded by the ruptures, we cannot concede prematurity as frequently an essential cause for ruptured membranes. A maladjustment of fetal parts, such as breech or transverse, was found in 4 per cent of the cases. Twins occurred three times, which is about the normal incidence. Twice the membranes were ruptured by the introduction of bags, and once they were ruptured as a therapeutic measure in accidental hemorrhage.

As a possible condition favoring early rupture, it would seem that an unusual rigidity of the cervix, which is sometimes found in dry labor, might be the cause instead of the result of the accident. This tendency might also apply to a cervix cicatrized from previous injury or operation. A cervix that dilates prematurely, without labor, undoubtedly predisposes to premature rupture. But in the absence of other causes of dystocia, labor in these cases should progress with celerity.

Our first study was of the relation of time of rupture to onset of labor. We found that approximately two-thirds of the cases (59 per cent) ruptured before labor; one-third (28 per cent) ruptured after the commencement of labor; and one-sixth (14 per cent) were reported to have rupture occurring with onset of pains. This gives us a ratio of 4:2:1.

In the first classification there were found twenty-five cases where rupture had occurred from thirty to one hundred and twenty hours before labor pains. The average length of labor in these cases was computed and found to be ten and a half hours. One half were under eight hours. The length of time that the uterus remained drained did not particularly affect the duration of labor.

For purposes of comparison the average morbidity and fetal mortality of this class of cases is compared with other classifications.

	MORBIDITY	FETAL MORTALITY
	%	%
All hospital cases	17.5	5.5
All cases of dry labor (270)	26.0	8.4
Cases with rupture 30+ hours before pains (25)	20.0	8.0
Cases with rupture 30+ hours before delivery (47)	19.0	8.5
Cases with 30+ hours labor (53)	34.0	15.0
Cases with labor under 10 hours (27)	27.0	5.0

In this connection the report of a private case is of interest. Mrs. H. E., thirty-nine years old. Previous labors, three: First 14 years ago, high forceps; second and third, low forceps, each followed by post partum hemorrhage. Date of expected labor, November 23, 1915. On November 26, the membranes ruptured. For four days there were no pains. Had the patient consented to hospital care I should, as was my custom at that time, have inserted a cervical bag. Under the circumstances, we simply delayed interference. November 30, four days later, pains commenced. Labor was normal up to the perineal stage, when forceps were used for inertia. Total labor, thirteen hours. The child was in good condition, weighing about nine pounds. The mother's recovery was without fever or other complications.

The second class of cases, i. e., those that ruptured after the onset of labor, showed thirteen cases of labor protracted to thirty hours or more, furnishing 23 per cent morbidity and 15 per cent of fetal mortality.

Those cases rupturing with onset of pains gave 11 per cent of morbidity and no fetal mortality.

These figures bring us to the inevitable conclusion that the length of time that the uterus is drained is a negligible factor in the causation of morbidity or mortality; but that the length of labor is an important reason for both complications.



Vaginal examinations, while offering a risk in all cases of labor, might be considered a greater menace in cases with ruptured membranes. All cases recording more than three vaginal examinations were studied—twenty-nine in all. The figures showed the startling morbidity of 52 per cent. The cases with no recorded vaginal examinations gave a morbidity of less than 25 per cent.

It is fair to state that in our morbidity figures all cases having a rise of temperature were included except those obviously explained by some cause other than pelvic. Thus every case of so-called "reactionary temperature" with a rise to 100.4° F. is listed. Evidently the cases not examined were uncomplicated and less protracted.

The operative treatment of dry labor, aside from the termination of the cases, consists in the use of the Voorhees bag for induction of labor or as a substitute for the bag of waters in expediting dilatation. The bags were used in twenty-five cases. In eleven, the chief purpose was to induce labor. Four special indications for induction were: eclampsia, toxic albuminuria, accidental hemorrhage, and placenta previa. In fourteen cases dilatation was desired in cases already in labor. Two of these had partial placenta previa.

In all bag cases the morbidity was 32 per cent; fetal mortality, 20 per cent.

Cases with dry labor the only indication, 26 per cent; fetal mortality, 21 per cent. Contrast with all dry labors, morbidity, 26 per cent; fetal mortality, 8.5 per cent.

In so far as the figures from so few cases can be used as an index, the employment of bags did not reduce the maternal morbidity and appeared unfavorable to the safety of the fetus. Of the five children lost, three were deaths (one premature) and two were stillbirths, both premature. One prolapse of the cord occurred as a complication of the use of the bag but did not result in the loss of the fetus.

The termination of these bag labors results in eleven, or 44 per cent, of operative deliveries, as follows: forceps; 1 high, 4 medium, 5 low,—and one cesarean, with hysterectomy for fibroid uterus.

The operative termination of all dry labors was 28 per cent, not including breech deliveries.

The recorded average labor after the induction by bags was thirteen and three-quarter hours, with a percentage of operative endings of 54.5 per cent.

The study of the delivery of the dry labors brought out some interesting figures. If we include breech labors with our operative deliveries, nearly one-third of the births required artificial assistance. Sixty-four of the operations were forceps, five high, thirty medium, twenty-nine low. To these might be added two cases of the application of forceps to the after-coming head in breech deliveries. The indications as given were: deformed pelvis, 16 cases; inertia, 12; persistent occiput posterior, 12; over-sized child, 6; rigid cervix, twice; tonic

uterus, once. In two cases, manual dilatation was employed, followed by a primary trachelorrhaphy.

The maternal morbidity was 28 per cent, with fetal mortality of 11 per cent, each 2 per cent higher than the average of the whole series of cases.

There were thirteen breech labors, two occurring in twin pregnancies and two in premature labors. The operations included two forceps, two breech extractions, one version from vertex for placenta previa, and one craniotomy on an after-coming head, with the child dead and the head held by a rigid cervix. Morbidity was 46 per cent; fetal mortality, 24 per cent. Lengthened dry labor in breech cases is therefore much more serious than in vertex cases. Furthermore, the proportion of breech labors in dry labors is more than twice the normal incidence.

The cesarean operation was used eight times,—for the following indications: six cases of disproportion, and two others with fibroids obstructing. There was one stillbirth in the case of a patient sent in with ruptured uterus. Two cases had a hysterectomy combined with the section, one with the ruptured uterus and one for fibroids.

Six of the eight patients had some temperature (one going as high as  $105^{\circ}$ ) but all recovered. All these patients averaged over thirty hours with ruptured membranes. One case (No. 1176) had undergone forty hours labor and five vaginal examinations. At the time of operation the temperature was  $101.4^{\circ}$ . For ten days post partum there was fever, rising to  $103^{\circ}$  as maximum.

Another case was a private patient, Mrs. B, thirty-nine years old, i. para. The membranes ruptured 36 hours before operation. There were two vaginal examinations. At the last, the cervix was high and thick, with the os admitting one finger. There was no evidence of pains. A flattened thickening to the left of the cervix showed a fibroid. When the uterus was incised, there was a distinct fetid or stale odor to its contents. The uterine cavity was swabbed with iodine, and the uterus and abdominal wall were closed without drainage. In the first twenty-four hours the temperature rose to  $101.4^{\circ}$ , and again on the sixth day to  $101.2^{\circ}$ . Otherwise recovery was normal, with primary union.

It is interesting to note in spite of the high morbidity that this series was free from maternal deaths. The inference would be that the drained uterus, even if existing for many hours, does not give the serious contraindication for Cesarean operation that has been maintained by many, especially if the examinations have been carefully used and other operative interference not attempted.

The study of the puerperal morbidity of our series gave 82 cases with temperature above  $100.4^{\circ}$ . From these we may subtract ten mastitis cases, leaving 72 cases in which we may ascribe fever to the labor.

They were divided as follows: 56 sapremic or septicemic; 12 reactionary; 3 postoperative (after laparotomy); and one eclamptic.

Taking these 72 cases as the morbidity of the series, there is a total morbidity of 26 per cent, which compared with the average hospital morbidity of 17.5 per cent, gives us a fair estimate of the maternal increase of risk in dry labor. Excluding reactionary eclampsia and postoperative temperatures, the morbidity is 21 per cent.

Of the sapremic, 29 were nonoperative. In searching for possible reasons for fever, there were ten cases with labor over twenty hours; seven cases with membranes ruptured a considerable time before entering the hospital; four cases of post partum hemorrhage; and three cases with several vaginal examinations.

Only eight of the sixty infected cases had fever above  $102^{\circ}$ ; and the average duration of fever was eight days. These eighteen we might call the seriously infected cases, one in fifteen. Three of them had no recorded vaginal examination, but had ruptured membranes some hours before admission. The other fifteen cases averaged three vaginal examinations. Eleven of them were operative deliveries. Three had post partum hemorrhages. Three of the eighteen had ruptured membranes before entering the hospital.

The one case of maternal mortality ruptured her membranes six hours after admission to the hospital,—twenty-five hours before delivery and eleven hours before labor. Two hours after the membranes ruptured, the patient had a chill. Following this, labor was induced by a bag. Twelve hours before delivery there was fever to  $101.6^{\circ}$ , increasing to  $102.6^{\circ}$  at delivery with pulse 148. On the third day the temperature was  $102^{\circ}$ . The fever ran a septic course until the patient's death on the twenty-sixth day. The premature child, weighing four and a half pounds, died on the third day. At birth it had a temperature of  $105.6^{\circ}$ . Infection here would seem to have occurred before the introduction of the bag. It showed a remarkably rapid onset after the rupture of the membranes.

An example of intrauterine contamination with fever antepartum is illustrated in case No. 315, Mrs. A. K., para i. Membranes ruptured while at home. Eight hours later, pains began. Sixteen hours later she walked in the hospital. Pains were moderate, every twenty minutes. There was fever,  $101.2^{\circ}$ , pulse 104. An occiput posterior was manually corrected, with birth about an hour later. The baby was covered with foul-smelling vernix. Placenta and fluids from uterus were also offensive. The puerperium was normal, without fever.

In another case, Mrs. C., private patient, para iii, membrane had been ruptured for 48 hours, when bag was inserted. Birth of child followed expulsion of bag, 21 hours later. At the time of delivery the mother's temperature was  $101.6^{\circ}$ . She ran an irregular fever up to the twenty-



first day, when a deep femoral abscess, due to phlebitis, was incised and drained.

The total mortality of 273 infants was twenty-three, or 8.4 per cent. This may be compared with the general hospital mortality of 5.5 per cent. There were eleven stillbirths, in which the probable causes contributing to death were: 4 forceps; 3 prolonged labors; 2 premature labors with placenta previa; 1 breech labor with rigid cervix; 1 unknown.

Of the twelve deaths, there were three forceps; six premature labors; two cases of atelectasis, and one congenital intestinal obstruction.

Dry labor therefore may be considered to increase the fetal mortality hazard three per cent.

In summarizing our conclusions, we should state that our deductions are necessarily confused by the fact that many of our cases had other reasons for prolonged labor, fever, and infant mortality than ruptured membranes. In other words, that obstetrical complications seem to be a cause for dry labor nearly as frequently as dry labor seems to be a cause for complicated labor.

It would seem established, however, by these figures that the length of time during which the membranes are ruptured before labor is not an important factor, either in prolonging labor or in producing morbidity or fetal mortality.

Protracted duration of pains in dry labor, on the other hand, greatly increased the morbidity and tripled the fetal mortality.

The morbidity risk increased consistently in proportion to the number of vaginal examinations. There can be no doubt that every vaginal examination in the patient with ruptured membranes is a dangerous procedure. The rectal touch should be employed as much as possible.

The use of the dilating bag, even when employed to induce labor, did not reduce morbidity and seemed unfavorable to the fetus. With an operative termination in 54 per cent of such induced labors, and an average labor of over twelve hours, the question arises whether induction of labor by bags is justifiable.

Dry labor requires operative termination in one-third of the births.

The risks of breech labor are much greater if the membranes are ruptured early.

The cesarean operations in the series gave very good results, despite the grave prognosis usually given to abdominal hysterotomy in dry labor.

Finally, we may sum up the condition of dry labor as increasing puerperal morbidity 8.5 per cent and fetal mortality 3 per cent, the dangerous elements being prolonged labor, intrauterine contamination (usually from vaginal examinations), and the operative terminations.

## FIBROMA OF THE OVARY\*

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**F**IBROMA of the ovary is a sufficiently rare condition to warrant the report of all carefully studied cases. Such tumors of the ovary were probably first mentioned by John Astruc in his lectures in 1740 at Paris, published in London in 1743: "Nevertheless, such tumors, and particularly scirrhus ones, are not very frequent in those organs" (the ovaries and tubes). Fullerton states that they were first discussed as early as 1749. A perusal of the statistics of large clinics or of men having extensive experience in pelvic surgery shows a surprisingly small number of true ovarian fibromata. The United States Army Medical Museum contains only eight specimens (Lamb). Sir Spencer Wells, in 1200 ovariectomies, found only three ovarian fibromata (Peterson). Kelly, in 1200 laparotomies, found four; and Loehlein in a series of 172 ovarian tumors found seven (Laidley). Thornton, in 500 cases of pelvic tumor, saw only three (Coe). Olshausen found six in a series of 293 ovarian tumors, while Orthman saw ten in 527. Hellman, in his excellent paper on the subject, reports six cases found out of a series of 4500 pathologic specimens covering a period of about ten years at the Frauenklinik of the Königl. Charité in Berlin.

We desire to report the following case:

E. C.; single; aged forty-six; was referred by Doctor Haws, of Advance, Indiana, for surgical treatment of a tumor in the lower abdomen. The family history is irrelevant. The patient had the usual diseases of childhood, and pneumonia at the age of twelve. She had occasional frontal headaches which were relieved by glasses at the age of thirty-two. Five years ago she had an attack of pain in the left lower quadrant of the abdomen. The pain was not exceedingly sharp and was not associated with vomiting, diarrhea, or constipation. She had with this attack some dysuria. Shortly afterwards she noticed a growth, a "hardness," as she expresses it, across the lower abdomen and that the latter was gradually increasing in size. Recently she had another attack of pain in the left lower quadrant of the abdomen and consulted her physician. He found a tumor to be present and referred her for surgical treatment. The patient's menstruation had been normal all her life, her periods starting at the age of fourteen and the menopause occurring five years ago, just before the onset of the present trouble.

*Physical Examination.*—The patient is fairly well developed and nourished. Aside from a few carious teeth and considerable pyorrhea, the head is negative. The heart, lungs and extremities reveal nothing pathologic. Palpation of the abdomen, over its lower part, reveals a mass about the size of an ordinary grapefruit situated a little to the left of the midline just above the symphysis pubis. There is some

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tenderness present in this region. No demonstrable ascites can be made out. Bi-manual examination shows this mass to be nearly spherical in shape, freely movable, and of quite firm consistency. The uterus cannot definitely be made out.

A blood count showed white cells, 7,000; hemoglobin, 85 per cent; red cells, 4,600,000; differential count, polynuclears, 75 per cent; small lymphocytes, 17 per cent; large lymphocytes, 8 per cent. Urine was clear, acid; specific gravity 1,020; sugar, absent; albumin, faint trace. Microscopic examination shows considerable bladder epithelium and an occasional pus cell and red-blood corpusele. Patient's

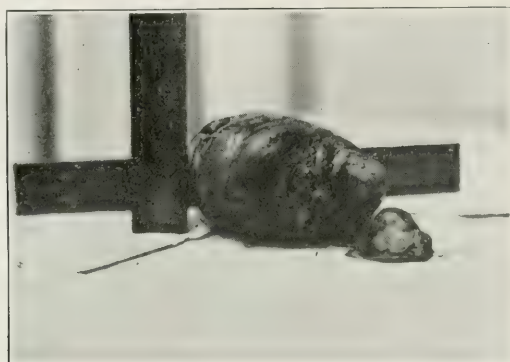


Fig. 1.—The tumor in gross. The uterus is seen as a small body lying at one side of the tumor and connected with it by the tube and broad ligament.

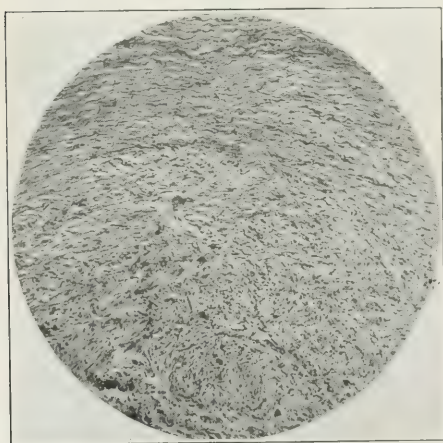


Fig. 2.—Low power; showing infiltration of lymphocytes, indicating beginning degeneration.

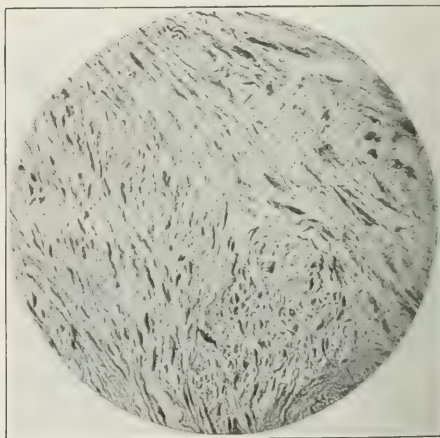


Fig. 3.—High power; showing newly formed connective tissue and occasional smooth muscle fibers.

temperature, 98.6° F.; pulse, 65; respirations, 15; systolic blood pressure, 120; diastolic, 84.

Operation February 28, 1920. Under ether anesthesia, after gas-oxygen induction, the abdomen was opened through a midline incision extending from the umbilicus to the pubes. The uterus was small and atrophic, situated a little to the right of the midline, deep in the pelvis. The pelvis was filled for the most part by a firm, smooth, spherical mass occupying the position of the left ovary. There was some free fluid in the abdominal cavity. A supravaginal hysterectomy and left salpingo-oophorectomy were done in the usual way. The appendix was removed as



an incidental measure, and the abdomen closed in layers. The patient was in good condition at the end of the operation.

Pathologic report of Dr. J. H. Warvel: The tumor in the gross was nearly spherical; of firm consistency, with well-developed fibrous capsule. A short section of the tube joined the tumor to the uterus, which was very small. The other ovary is enlarged and cystic. Microscopically, the section of ovary showed a rather loosely connected fibrous tissue. The nuclei of many of these cells being lost. There was no evidence of mitosis. Some areas showed a degeneration of the connective tissue with an infiltration of lymphocytes. All ovarian tissue was lost. The tumor is quite vascular. Diagnosis: Fibroma of the ovary. (See Figs. 1, 2 and 3).

A rather extensive investigation of the literature on the subject of ovarian fibroma reveals three outstanding papers; namely, those of Coe, 1882; Peterson, 1902; and that of Hellman, 1915. Mention might also be made of a book on ovarian tumors by Peaslee, published in 1872, in which a section is devoted to this subject. The remainder of the literature, however, consists chiefly in reports of single cases, and unfortunately, often without microscopic examination of the tumor. It has been repeatedly emphasized that the diagnosis of such a tumor as an ovarian fibroma should be made by a competent pathologist only after a painstaking microscopic examination. The literature contains several case reports in which the tumor is diagnosticated as an ovarian fibroma merely upon its gross appearance and hardness, while other reports describe tumors diagnosticated as fibroma before microscopic section, only to show some form of sarcoma, adenofibroma, etc., after section was made. Pure fibromata *per se* are considered here.

Considering the infrequency of the condition, deductions regarding the etiology, symptomatology, diagnosis, prognosis and treatment, as well as the pathology, must necessarily be made from reports in the literature in lieu of extensive personal experience. Coe has called attention to the fact that ovarian fibromata are either absolutely ignored in textbooks or else passing comment is made as to their rarity or obscurity and nothing else is said about them. This is true of many French writers as Edis, Gallez, Courty, Becquerel, and Nonat. Among the German writers, Leopold, Scanzoni, Bigel, Olshausen, Schroeder, Virchow, Rokitansky, Klebs, Rindfleisch and Klob have either reported cases or discussed the subject, especially from the pathological aspect. Among American writers, Churchill, Goodell, Sims, Emmett, Atlee, Peaslee, Thomas, Laidley, Fullerton, Peterson, and Hellman have especially called attention to the condition.

Ovarian fibromata comprise approximately two per cent of all ovarian tumors (Hellman and Reel). They occur from the time of puberty to an advanced age, the youngest reported being in a girl of seventeen years (Hellman's case), while the oldest was in a woman of seventy-three (McCann). The majority occur in single women and around the menopause. Cases have been reported complicating pregnancy (Carstens). Peterson in 1902 remarked their occurrence in whites exclusively; but Dickenson, in Goffe's paper two years later, cites a case of

ovarian fibroma removed from a negress. The size and weight of these tumors as reported in the literature vary extremely, the smaller ones being found completely enclosed within ovarian tissue, while the larger ones reach the weight of fifty-six pounds (Simpson), or even forty kilograms (Clemens). Virchow states that the size of true ovarian fibromata varies from that of a hen's egg to a child's head.

The etiology of these tumors always has been, and still is, obscure and much has been written pertaining thereto. The widely divergent views of many pathologists and surgeons are given in Hellman's paper. An origin in the corpus luteum is attributed by Scanzoni, Rokitsky, Klebs and Schauta. Hemorrhage into the ovary as an etiologic factor is given by Brothers, Kroemer, and Koeberle. Kiwisch, Virchow, Klob, Peaslee and Olshausen assert an inflammatory origin. Hellman thinks the tumor must come from connective tissue which may be found in five places in the ovary: first, the stroma of the ovary; second, the corpus luteum; third, the corpus fibrosa; fourth, in organized blood clots, and fifth, in the capsule of the ovary. He feels this sudden increase in normal connective tissue elements to be due to, first, inflammation, mechanical, as hemorrhage or hyperemia; second, bacteria, as follicle infection; third, scirrhotic, from retrogressive changes at the menopause; or fourth, possibly to some chemical action.

In the majority of the reported cases patients have complained of a swelling of the abdomen, pain of varying degree, often none at all, and not infrequently of feeling a hard mass through the abdominal walls. Other symptoms, such as frequency of urination, constipation, etc., are due to varying mechanical factors. Objectively, the tumor is usually palpated without difficulty. Its consistency, mobility, and unilateral occurrence are significant. One feature, however, is of marked diagnostic importance when present; namely, ascites. The weight attached to this finding has been especially emphasized by English writers on the subject. It may be recalled that fibroma elsewhere, and especially in the uterus, is rarely associated with ascites. The presence of ascites with intraabdominal carcinomatosis, located either primarily or secondarily in the ovary as a tumor mass, is common, but is associated with many other signs and symptoms not found in fibroma of the ovary. In other benign tumors of the ovary, ascites is usually lacking. It, therefore, seems of considerable diagnostic importance to find ascites together with a unilateral adnexal tumor in a case lacking signs of cachexia, great loss of weight, or symptoms pointing to a focus of malignancy elsewhere in the body, as in the breast or stomach. Hellman states that only 5 per cent of ovarian fibromata show ascites. When present, the collection of fluid may reach huge proportions, as in the case reported by Goodell, where repeated tapplings were necessary for the relief of pressure. Olshausen believes such ascites to be due to mechanical causes (Hellman), a view shared by an anonymous writer (1903) who thought the movement of the tumor in the abdominal

cavity produced the fluid. However, secretion from the tumor (Schatz-schen), hyperemia (Schauta), and a chemical origin (Pfannenstiel, quoted from Hellman) have also been advanced as causes.

In the absence of ascites, differential diagnosis from that of other adnexal tumors offers considerable difficulty. The tendency of ovarian fibromata to be unilateral, movable and hard, should be borne in mind. In the presence of ascites, where nephritis, cardiac decompensation, portal obstruction, abdominal carcinoma, tuberculous peritonitis, and the anemias can be ruled out, the occurrence of such findings should make one very suspicious of ovarian fibroma.

The treatment, without exception, is operation. The prognosis, as indicated from case reports, is excellent.

The pathology of ovarian fibroma has been carefully studied by several investigators. In fact, the literature consists chiefly of pathologic studies. Grossly, as already stated, maintains that these tumors vary tremendously in size. Their consistency, likewise, is extremely variable; some, composed of a loosely woven network of connective tissue, being soft; while others, as in the case reported by Sir Spencer Wells, require the use of a bone saw for their section. In a similar way their shape, appearance on cross section, color and general outline cover a wide range of possibilities. They show many forms of degeneration and it is on account of these as well as the possibility of a twisted pedicle, that their removal should be urged. The court of final judgment is the microscopic appearance of the tumor. Hellman insists that there must be a certain regularity of the individual fibers or muscle cells and strands, despite varying quantities of cells, fibers, vessels and degenerative changes. He found the cells in his case to be short and spindle-shaped with a slightly bent or pointed nucleus. Edema, necrosis, hyalin masses, and fatty changes are not uncommon. Several writers, especially Coe, have mentioned the occurrence of geodes, presumably dilated lymph spaces, which are seen in these tumors. Cases are reported also in which bone, cartilage and chalk have been found.

#### CONCLUSIONS

1. Ovarian fibromata are sufficiently rare to warrant the report of all carefully studied cases.
2. The diagnosis is dependent solely on microscopic examination.
3. In the presence of a hard, unilateral, movable tumor with ascites, where the more common causes of ascites can be ruled out, ovarian fibroma is highly probable.
4. The treatment is operative; the prognosis good.
5. The gross pathology of the condition is extremely variable; the microscopic pathology, as pointed out by Hellman, must show a certain regularity of the individual fibers or muscular cells and strands, despite varying quantities of cells, fibers, vessels and degenerative changes.



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## SOME INDICATIONS FOR HYSTERECTOMY\*

By J. F. BALDWIN, M.D., F.A.C.S., COLUMBUS, OHIO

AS a general rule most surgeons limit their indications for hysterectomy to fibroids producing marked symptoms, to cancers, and rarely to certain types of puerperal infections; but occasionally they extend their advice to cases in which double tubo-ovarian abscesses have been removed, and in which the uterus is found denuded of its peritoneum.

A composite picture of a certain class of patients who present themselves very frequently to the physician, would represent a woman usually between 30 and 40 years of age, but with the limit extending in either direction; she has usually had one or more children, or miscarriages, or both; there often is a laceration of the cervix; the uterine body is enlarged, hard and tender, with more or less tendency to dropping down and retroversion; there is a history of prolonged and humiliating leucorrhea, pronounced dyspareunia, backache, bearing down, marked pelvic discomfort and general unhappiness. Almost invariably she has been treated locally by pessaries, tampons, curettements, Churchill's tincture of iodine, carbolic acid, Battey's iodized phenol, or something of that sort; during treatments she has perhaps felt a little better, but improvement, if anything more than imaginary, has been very transient.

Only a few months ago a patient was referred to me who had been studied in a celebrated Baltimore clinic for over two weeks. She had come home with the advice to keep quiet for a number of weeks, and to be dieted so as to reduce her weight by 15 pounds, as she was that much heavier than the average. (Her 15 pounds overweight was a family characteristic and therefore physiologic.) On obtaining her history I found that she had been wearing a pessary for over 12 years; she was menstruating every three weeks, the flow being about twice the normal and more or less clotted; there was a profuse leucorrhea, and pronounced dyspareunia, backache and bearing down pain. On examination I found a deep bilateral laceration of the cervix, the finger readily passing to the internal os; the uterus very tender, much enlarged, hard, and a little irregular in outline. Hysterectomy was advised and performed. The operation revealed a fibroid an inch in diameter at one horn of the uterus; extensive adhesions at that point, and the uterus itself weighed four times the normal. Her recovery was abso-

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

lutely uneventful, and now there is no more leucorrhea, no dyspareunia, and she can go out riding with her husband without the slightest discomfort, and is in every way in infinitely better health than she has been for many years.

I know of no treatment, local or constitutional, which will cure these cases of chronic uterine hyperplasia. If the condition is quite recent, hygienic treatment, hot douches, and possibly tampons may occasionally restore the parts to normal, but I am speaking here of chronic conditions.

Abdominal hysterectomy for the conditions mentioned is an operation which, when properly performed, is almost absolutely devoid of danger; while the relief afforded is prompt, complete, and permanent. Repeatedly, within a week of the operation, patients have told me that they had not felt so well for ten years, and I have no truer friends in my clientele than the many hundreds who have been subjected to this operation.

A number of years ago the late Maurice Richardson wrote an article in which he mentioned the dangers inherent to every operation, but having no direct connection with the operation itself. These dangers are present in every hysterectomy, but when the endometrium and vagina are sterilized, as in the technic which I described and clinically demonstrated at the meeting of the Association in Louisville, in 1916, the danger of peritonitis would seem to be eliminated, and that eliminates, humanly speaking, all the direct dangers of the operation. The occasional deaths which will take place from the causes mentioned by Dr. Richardson, will be vastly more than balanced by the improved health of the patients and the prolongation of life as the result of increased resistance to ordinary infections.

In saving the ovaries I feel that it is very important to save the tubes as well, unless they are badly diseased, since the nutrition of the ovary is so largely dependent upon the blood supply afforded by the tube.

At the completion of the operation the round ligaments and the stumps of the broad ligaments should be implanted in the vault of the vagina, and the ovaries attached to the round ligaments well up on each side so that they will not drop down into the culdesac where they might be a source of discomfort.

As the cervix in this class of cases is almost invariably unhealthy, and doubtless responsible for much of the leucorrhea, it should always be removed with the body of the uterus. Panhysterectomy I have been insisting upon for a number of years, partly to get rid of the unhealthy tissue and partly to obviate possible malignancy developing later.

Dr. W. J. Mayo recently (*Jour. Am. Med. Assn.*, June 19, 1920) wrote quite at length of the importance of preserving the menstrual function. He even suggests that "menstruation itself has some important



endocrine function," and says that "the effect on the patient is essentially the same whether menstruation is stopped by removing the ovaries and leaving the uterus, or removing the uterus and leaving the ovaries."

My own experience and observation has been so entirely different from this that I was surprised at the statement. Because of my having devised, a number of years ago, a method of operating for the construction of an artificial vagina, I have been consulted by a considerable number of women who had been born without a vagina; and, incidentally, in all those cases also without a uterus, although never without ovaries. Necessarily there had never been any menstruation, and yet in all those cases, except for the deformity, the women were apparently entirely normal and womanly, and many of them decidedly attractive. Twice I was consulted by young women having normal vaginas, but no uteri. They, too, seemed perfect women. We have all seen considerable numbers of women with absolutely infantile uteri, and yet they were normal except for the amenorrhea. I have done several thousand hysterectomies and the results have been so uniform that I had regarded it as a settled fact that the mere function of menstruation was entirely unimportant, and frequently a disadvantage and annoyance; but that the preservation of the ovary and its internal secretion, particularly in young women, was of very great importance to happiness and health. Hence, I have for many years removed the uterus without the slightest hesitation, except as its removal prevented child-bearing, while I have practiced conservation of the ovaries in women under forty, particularly under thirty-five, with the utmost care.

Why it is that the human female is the only one throughout the animal creation that menstruates, no one has been able to determine satisfactorily. Several hypotheses have been advanced. The statement has been made that the female of the monkey menstruates, but that has been authoritatively denied. While the menstrual function has a known average of time and amount, some women have such a scanty flow as to be practically none at all; and yet such women seem to be as healthy and fruitful as others. And it is well known that, occasionally, a perfectly healthy woman will have her pregnancies at such intervals that she has no flow whatever during her entire child-bearing life. It would seem self-evident that if the menstrual flow itself were of any particular importance it would extend throughout the animal kingdom, at least the higher types of animals, and its occasional absence in the human individual would be attended with marked and definite symptoms of ill health.

Since the publication of Dr. Mayo's paper I have taken pains at every opportunity to talk with patients upon whom this operation had been done a number of months or years previously, and their testi-

mony has been uniformly contrary to his conclusions. My patients were all private patients, and my opportunities for ascertaining post-operative conditions have been unusually good, so that I may state without fear of contradiction that postoperative discomforts, when normal ovaries are saved and with ample blood supply, except as due to other complications, are not present.

It occasionally happens that a surgeon is consulted by a woman who has suffered from dysmenorrhea throughout her entire menstrual life; if married, there have been no pregnancies, and the menstrual pain frequently precedes the flow by several hours or days. The menstrual discomfort and consequent disability may last for two or even three weeks out of every month. Examination will not infrequently show the presence of an undeveloped uterus, which has been the source of all of this discomfort, and which has been of no possible benefit. If the patient is young it is possible that the wearing of a cervical dilator for weeks or months, as advised by our late colleague Dr. Carstens, might produce such development of the uterus as would result in functional usefulness. I have tried that treatment in a number of instances; but thus far with uniform failure. However, its cautious trial might be wise so as to give the patient every chance. If, however, she is advanced in years no one would anticipate any improvement by that treatment; and in all those cases, if the pain is such as to demand relief, removal of the uterus should be made. In the comparatively young the ovaries should be saved because of their internal secretion; but the offending organ, the undeveloped and functionally imperfect uterus, should be extirpated.

The office of the surgeon is to save the life of the patient when it is in jeopardy; but more frequently it is to restore to health and happiness a chronic invalid. This paper is a plea for the cure of a class of chronic invalids who can be cured by the treatment suggested but who, too frequently, drift from one physician to another, to be treated by inert methods long since discredited by intelligent members of the profession.

#### CONCLUSIONS

(1) Chronic uterine hyperplasia is incurable by local or constitutional treatment, and its presence is the source of much ill health, discomfort, and unhappiness.

(2) Uterine hypoplasia is generally, if not always, a source of sterility, marked dysmenorrhea, and much invalidism.

(3) In these two conditions hysterectomy effects a cure, "*tuto, cito et jucunde*," and should be resorted to when the diagnosis has once been established.

## LUTEUM EXTRACT: A FURTHER REPORT\*

BY ADAM P. LEIGHTON, JR., M.D., PORTLAND, ME.

FIVE years ago, I presented to this Association, a consideration of the use of corpus luteum extract in the treatment of the neuroses of the artificial and physiologic menopause, in dysmenorrhea, and for the relief of those symptoms usually coincident with, or following in the wake of lessened ovarian function. At that time I reported results obtained through the administration of this product, when specifically indicated and, in addition, had the temerity to incorporate in that paper, some personal theories to explain how the remedial action was brought about.

It is not my intention to delve deeply into the subject of general organotherapy or to attempt to explain in detail, physiologically, the probable reason for the beneficial results accompanying or produced by, the ingestion of luteum extract. The subject is too involved and contains so many diversified and contradictory opinions, that I confess, indeed, my inability to apply, to any great extent, the multiplicity of theories given in explanation of the supposed synergistic action and interrelationship of the several ductless glands.

In the past six years and a half, I have had the opportunity to employ ovarian organotherapy in the treatment of over three hundred women, each one of whom presented definite symptoms of diminished ovarian secretion, combined in some instances with lessened activity of other endocrine glands. They have all been private patients and, for that reason, I have been able to keep accurate case records and to observe in the majority the effect of thorough and prolonged treatment. I admit that the number of cases is small and that little importance may be attached to a report of this kind, however, my desire is but to state the result of my observation of these cases in which the only ovarian product used was luteum extract.

The importance of the endocrine glands in the physiologic economy has, in the past few years, been especially emphasized. Consistent with the advance of scientific knowledge of the subject, the greater and more widespread use of glandular substances in therapeutics has occurred. Laboratory experimentation has greatly aided in our understanding of certain glandular function, but for the most part our knowledge of the action of the ductless glands has come through clinical evidence and observation and, in regard to the corpus luteum, almost entirely.

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.



The endocrine system is so finely balanced that a change in the internal secretion of one organ is capable of upsetting the entire equilibrium of the system. One, therefore, must consider the normal interrelation between a disturbed endocrine gland and the rest of such glands, before attempting to explain the symptomatology produced by the cessation or improper performance of function on the part of the individual organ of internal secretion.

The question as to what tissues in the ovary are responsible for the manufacture or elaboration of the internal secretion, still remains practically unsettled. In recent years, much discussion of this subject has taken place and, while it is admitted that the corpus luteum exercises an obvious internal secretory activity, there is good evidence that the interstitial cells of the ovary, have a function of distinct similarity.

Dr. Graves, of Harvard University, in his recent article on "Ovarian Residue" has endeavored to prove that an internal secretion equal or superior in therapeutic value to that produced by the corpus luteum, is manufactured in the general ovarian tissue. This investigator, claiming to have obtained irregular and unsatisfactory results from the administration of corpus luteum extract and a product from the whole ovary, resorted to the use of "ovarian residue" or that part of the ovary which remains after extirpation of the corpora lutea and which heretofore has been discarded as valueless. Dr. Graves has made use of ovarian residue in the treatment of those patients who exhibited the signs and symptoms of ovarian deficiency for which he had previously considered the other two products indicated and, after considerable experience with this new substance, he states that it is superior in its clinical results to any other ovarian preparation; that it preserves its chemical integrity longer and that, in truth, the secretion of the atretic follicles arising from cells analogous to the cells of the corpus luteum, is similar in action and more potent. I am unable to compare the respective merits of the two preparations, inasmuch as I have never used ovarian residue. Recently, I have had the opportunity to note ready response to luteum extract in the relief of menopause symptoms, in two patients to whom ovarian residue had been given by another physician, without benefit. It is fair to state however, that I doubt if these two women had given the ovarian residue sufficient trial and that alone may explain the unsatisfactory result. It will be interesting to note the results obtained by other observers making use of this newer product, for while one does not doubt its efficacy, it is only through comparative results that we are able to arrive at the proper decision in regard to organotherapeutic treatment.

The correlation of the ductless glands, presents an intricate and interesting study. Certain truths we accept, but unfortunately most of our knowledge of endocrine function is theoretical and in endeavoring to differentiate between the physiologic phenomena supposedly

arising from this glandular activity in the normal state and the symptoms caused by abnormal functions, we meet with difficulty.

I have repeatedly observed, however, such a seemingly close association between the thyroid and the ovarian activity, that I cannot pass it by without due reference; because it has been demonstrated in my experience that, in the treatment of women presenting definite signs of ovarian deficiency, the use of thyroid extract is necessary in combination with luteum, to the end that the action of the latter is greatly enhanced, and more prompt, satisfactory, and lasting results are forthcoming.

I refer not only to those cases with undoubted thyroid insufficiency in which it is necessary to make use of thyroid extract, but in those instances where the etiologic factor of hypofunction is lacking and the condition is attributed to ovarian dysfunction entirely. Here I have given luteum extract thorough trial, without the usual benefit, and yet, where I add the thyroid extract in an empirical fashion, satisfactory results are often obtained.

While the correlationship of the adrenal, thyroid, pituitary and ovary is theoretically well known, it seems to me that the relative activity of the thyroid and that of the ovary is more suggestive, and probable.

It seems rational to believe that the thyroid exercises a particular governing effect upon the whole endocrine system, in truth, possibly presiding over and maintaining the synergistic action of the whole. No definite explanation has ever been offered for the hypertrophy and hyperplasia of the thyroid occurring during the menstrual period, pregnancy and in the early stages of ovarian deficiency, and yet it is obvious to all of us that an increase of thyroideal activity, to a greater or less degree, is evident at that time. It is a normal physiologic function, generally, but becomes decidedly abnormal when associated with primary hypofunction of the ovary or of any other gland of internal secretion.

May I be allowed to venture the proposition that, in cases of lessened ovarian function, this increased activity of the thyroid, manifesting symptoms of hyperthyroidism, many times is but a compensatory action of this organ, to supply the extra stimulus to the ovary, necessary for the maintenance of the phenomena presided over by the latter.

How often do we see this picture of slight ovarian insufficiency, coupled with thyroideal hyperfunction, and all the symptoms of the latter, followed soon after by the signs of thyroideal hypofunction; or, as I would call it, thyroideal decompensation. That this same picture may be noted when lessened activity of another gland occurs, and not the ovary, is likewise assumed, hence the idiopathic hyperthyroidism.

I have made use of thyroid in conjunction with luteum extract in the relief of some cases of menorrhagia, where uterine, adnexal, and

other pelvic disease, or tumor, might be ruled out. It has been as a matter of experiment, I will admit, but more often than not, exceptional benefit has followed.

The use of luteum extract uncombined in cases of premenopause menorrhagia, has brought about a marked diminution in flow and in the menorrhagia coexistent with ovarian cystic degeneration, mitigation of the hemorrhagic tendency is usual.

In my previous paper, mention of the fact was made that dysmenorrhea of a certain type was especially amenable to treatment through ovarian organotherapy. Others have reported excellent results. There is no doubt but that aside from the causes enumerated in text-books, ovarian dysfunction is a distinct etiologic factor. We do obtain results and therefore in explanation might we not assume that the ovarian hormone has a peculiar selective action in the uterus, in perhaps stimulating some endometrial autolytic enzyme, which so softens and digests the histologic elements of this tissue so that the normal physiologic phenomena (diapedesis, rupture of the hematmata, and exfoliation of the mucous membrane) are made possible and easy, thereby constituting normal menstruation. Where this ovarian hormone is altered or lessened, it may fail to stimulate in sufficient amount, this autolytic enzyme, with the result that the endometrium, lacking in its proper preparation and softening acts as a barrier to an easy escape of blood; the congested membrane either remains to form a foreign body and sets up uterine spasm or becomes detached in the comparatively large portions which are characteristic of so-called membranous dysmenorrhea. This is but a repetition of my former suggestion and, when I consider that the most favorable results were noticed in the administration of luteum extract, in those cases presenting the excessive first day pain, with scanty discharge simulating an intense unrelieved congestion, it is not altogether illogical.

Dysmenorrhea demands continuous use of luteum extract for a period of ten to twelve weeks, before one may expect to obtain relief, if such is to follow. To give luteum, or any ovarian product to a woman, with the directions to take it for the week or ten days previous to each menstruation, and to expect results, is a waste of time and money; and yet, I have often seen prescriptions calling for this inefficient therapy.

Hyperthyroidism and even early exophthalmic goiter has been distinctly aided by luteum. The extreme cardiovascular and general nervous manifestations have been lessened. Hoppe, of Cincinnati, has recently reported excellent results and bases his treatment on the theory that hyperthyroidism is caused by defective secretion of the interstitial sex glands and that the hormones of these have an inhibitory and regulating action on the secretion of the thyroid. When their function is deficient there is this lack of thyroideal inhibition with



the resulting excessive secretion of this organ or hyperthyroidism. Given primary ovarian insufficiency, or of any other ductless gland, I believe that this hyperthyroidism is the result of continuous and prolonged compensatory effort upon the part of the thyroid to make up the deficiency in action of that gland which first became underactive.

In the menopause in contradiction to the reports of others, relief of the distressing symptoms is especially possible. Luteum extract supplies that element so necessary to the woman during her normal menstrual life. This therapy exerts its greatest benefit in the treatment of those women who have begun to exhibit the early manifestations of the climacteric. To avoid the unsatisfactory results which have been reported by some gynecologists, it is necessary that luteum extract should be administered early and continuously once the diagnosis is made. Procrastination on the part of the patient or the physician often means ill success. When menstrual irregularity makes itself known and the hot flushes, mental confusion, tremor and hyperthyroidal symptoms are first evident, then is the proper time for ovarian organotherapy, not waiting until the height of the disorder has been reached or the woman has suffered for months or years with a "chronic" menopause. Early control is necessary and, once obtained, it is easy of maintenance. The action of luteum extract is slower, I have observed, and it takes longer to gain the effect of this product in the climacteric, than in any other condition depending on or due to ovarian deficiency.

In over half of those 300 or more women mentioned previously, to whom luteum extract was given, the indication for its use was solely the menopause symptoms. Of this entire number, there were not over a dozen who could not report exceptional benefit, even to absolute relief. The results gained seemed wholly in relation to the duration of the menopause and the length of time in which luteum was administered. Early menopause symptoms responded almost generally and completely. The longer the use of luteum extract had been put off, the poorer the results and the harder to gain control. Most of these women continued, or are continuing the treatment over a period of anywhere from three or four months to two years or more, obtaining relief all this time, or ultimately leaving off, when they have seemingly been helped through this trying epoch of their life.

The masterly paper of Dr. Sanes, of our own Association, on "The Hot Flushes of the Menopause," contains much of value and interest in the discussion of the etiology of this symptom.

Far be it from me to endeavor to utilize any part of his scientific presentation of the subject, but while you may accept the probable explanation, through the hyperactivity of the adrenal medulla, sympathetic system, thyroid, and posterior hypophysis, and conclude that the organotherapy of the menopause calls for the follicular structure

of the ovary, extract of adrenal cortex, and extract of the anterior pituitary, with the corpus luteum theoretically excluded, I can conscientiously and truly report the preceding satisfactory results with corpus luteum extract used alone. The prolonged and thorough use of luteum in the early physiologic and artificial menopause does relieve, and I am hoping today to hear others make a similar statement, to prove the truth of this remark.

To those women who during the menstrual life complain of so-called "sick headaches" of the frontal and temporal type, with nausea and vomiting, which occur with peculiar periodicity, at or about the time of menstruation, ovarian organotherapy offers much relief. At least that has been my experience.

In chlorosis, as an adjunct to hematinics, luteum is also indicated. I make it a point to prescribe it in each case, and in those instances where the moderate hyperthyroidism is present the action is especially beneficial.

The functional amenorrhea of women, in early adolescence or mid-menstrual life, responds in a miraculous manner as you all know. If obesity is a coexistent condition, thyroid is of inestimable value. No doubt pituitary dysfunction is to be considered in many of these patients; but, as yet, I have not made use of any pituitary product, relying wholly upon luteum or a combination of luteum and thyroid.

In obese patients where this deposition of fat is attributable to thyroid insufficiency, thyroid has long been used to remedy the abnormality. How often do we find that there are and have been symptoms of certain ovarian hypofunction also, and in fact, we are able to trace the origin of this type of obesity to primary ovarian lessened secretion, followed by thyroid decompensation, after the latter's attempt, for a while, to maintain a normal endocrine function.

In the use of thyroid as a "reduction cure" the giving of luteum at the same time seems to obviate the occurrence of profuse sweating spells, muscular weakness, tachycardia, nausea, and other vasomotor symptoms, occasionally following the ingestion of thyroid extract. Larger doses of thyroid are tolerated, if given in combination with luteum.

From these brief remarks, one might gather that I had found ovarian organotherapy one hundred per cent successful. Such is not the case; and, most assuredly shall I state, that in many cases where luteum was seemingly indicated, the results have been *nil*.

However, in those conditions where the administration of an ovarian product is called for, it has been my fortunate experience to observe a relief and cessation of many disorders, referable to deficient ovarian secretion, where proper diagnosis is followed by the continuous, thorough and regular use of luteum extract. It is important above all, that one should prescribe and the patient obtain a product from

recent fresh material and care must be taken to see to it that the dispensing chemists have such on hand. The indiscriminate buying of luteum extract is one thing which I am careful to prevent. A patient is directed to the shop where I know fresh tablets are to be had. Each prescription calling for such, bears on the directions label, "These must be taken for ten or twelve weeks" and special emphasis is laid upon this point. I explain every time, at the commencement of treatment, that it is cumulative in action, that it is nontoxic, when fresh, and that one must be conscientious in its taking, as results are obtained slowly and relief is not immediate.

192 STATE STREET.

(For discussion, see p. 633.)

### CHORIOEPITHELIOMA FOLLOWING HYDATID MOLE, WITH REPORT OF A CASE

By BYRON H. GOFF, M.D., NEW YORK, N. Y.

STATISTICS on the incidence of hydatid mole by recognized authorities vary widely but all point to the rarity of the disease. Thus, Madame Bovin, in 1827 claimed an incidence of one case of mole in 20,000 pregnancies. Williamson in 1900 stated that it occurred once in 2,400 cases, while Pozzi claimed never to have seen an hydatid mole in more than 6,000 obstetrical patients which passed under his observation. More recent statistics, however, show a somewhat higher proportion than the above. Mayer, in 1911, reported in 3,105 pregnancies, one in 310 cases, and Essen-Moller, in 1912, while reviewing the histories of 6,000 patients treated in the Frauenklinik at Lund found that hydatid degeneration had occurred once in every 333 cases. Arthur W. Meyer in 1918 in a report upon his deductions from a study of over 150 new cases of hydatid mole states that the highest incidence ever reported was that of Storch who in 1878 estimated it at 50 per cent but did not publish records of his cases. It is to be noted, however, that Storch laid emphasis upon the frequent occurrence of hydatid degeneration in the early weeks of pregnancy, and pointed out the fact that the large typical mole which attracts the attention of the obstetrician is a relatively rare form of the disease.

Meyer calls special attention to the importance of the work of August Gierse, which was published posthumously by Meckel in 1847, and comments upon the failure of those who have subsequently written upon the subject to have recognized the remarkable character of his observations. Gierse first undertook to familiarize himself with the appearance of the normal chorionic villus; he believed that villi in abortions were seldom normal, and claimed that definite transitional forms could be traced between the slightest change in the calibre of villi and the most marked hydatid change. He described a villus showing hydatid de-



generation from a chorionic vesicle about 12 mm. in size with the largest hydatid one third of a line large. He stated also that such pathologic changes are present in many abortions and seem to be the most frequent cause of abortion in the early weeks of pregnancy. Though Gierse's work has not received general recognition, his findings have been completely confirmed by Meyer's work in the Department of Embryology, Carnegie Institution of Washington. Meyer states that the records of the Mall Collection show eight cases of hydatid mole in 2089 uterine specimens, a proportion of one in 261 cases. Though these figures are eight times higher than those of Williamson and slightly higher than those of Essen-Moller they are not necessarily contradictory since they represent the incidence of hydatid mole in specimens largely under seven months and not over the entire period of pregnancy. Moreover, they do not represent the actual occurrence even in the early months of pregnancy since they are based on gross examinations and not upon a microscopic study.

A careful gross and microscopic study by Meyer of material from over 400 abortions showed an actual incidence not eight times but 240 times greater than that of Williamson and 33.3 times greater than that of Essen-Moller. It is to be especially remembered, however, that these figures are based upon the findings in abortions in the early weeks of pregnancy and by no means represent the occurrences in the later months.

Meyer's interesting findings justify his conclusion that hydatid degeneration is a common disease in the early weeks of pregnancy becoming less frequent as term is approached. He states that he does not know the exact incidence in the later weeks but that the condition is, no doubt, a relatively rare one as former statistics would indicate.

Basing his statement upon previous statistics, Findley says that 16 per cent of hydatid moles are followed by chorioepithelioma. Teacher, on the other hand, believes that less than 5 per cent develop malignancy. In the light of the more recent findings of Meyer it is a difficult matter to say exactly what percentage of all moles eventually develop chorioepithelioma; obviously it must be lower than generally given. In regard to this phase of the subject Meyer emphasizes the fact that the type of mole which he studied,—the early one,—shows a decided tendency to abort early and completely and to produce no further trouble in the vast majority of cases while the type which shows more prolonged and vigorous growth is more likely to be followed by malignancy.

Neuman in 1897 claimed that he could differentiate between two types of hydatid mole one of which was and the other was not followed by chorioepithelioma. Findley and others believe that moles occur in one of two forms, malignant or benign and that the differences are biologic rather than structural. The accepted view at the present time is

that it is impossible to predict the outcome of a case from the histologic picture.

Clinically two types of chorioepithelioma are recognized, malignant and semibenign. Robert Meyer and Velits have claimed that there are histologic differences between them. Ewing also is of the same opinion and states that there are certain general relations between histologic structure and clinical course. This opinion is not, however, that of the majority of pathologists.

The exact number of cases of chorioepithelioma reported to date is difficult to state because of the scarcity of literature, especially from abroad, during the past three years. Vineberg in a careful review of the literature has collected 533 cases reported before the end of 1917.

Chorioepitheliomata of the testicle and ovary are in reality teratomata developing in the chorionic stage and have the same genesis as other teratomata. All others are essentially based upon a preceding pregnancy; they follow hydatid mole, abortion, pregnancy at term, and ectopic gestation. Teacher's statistics upon 188 cases show that 39 per cent followed mole, 31 per cent followed abortion, 26 per cent labor at term and 4 per cent ectopic pregnancy. Other reliable statistics show similar proportion.

The disease occurs in women between the ages of seventeen and fifty-five years. Teacher gives the average age in 188 cases as thirty-three years; 67 per cent occurred between the twentieth and fortieth years. There were 6 cases below the twentieth year and 9 over the fiftieth year. The incidence in multiparous women is higher than in primiparae.

The usual site of the tumor is the corpus uteri; an occasional case has been reported in an atypical site.

The period of time which elapses between the pregnancy and the appearance of a chorioepithelioma varies from a few weeks to several years. Vineberg calls attention to the fact that a chorioepithelioma may develop before the expulsion or removal of a mole and mentions a personally observed case in which this occurred.

Among the symptoms referable to chorioepithelioma, uterine hemorrhage, slight, moderate or profuse, is the most common. It is well to remember that the hemorrhage may rarely be intraabdominal, if the tumor has penetrated the uterine wall, and may produce symptoms which simulate those of ruptured ectopic gestation. Amenorrhea has been reported in connection with the disease in a few cases. Pelvic pain is usually present, colicky while clots are being thrown off, and dull in character if due to pelvic metastases. The uterus is usually enlarged, though not invariably so. The size seldom exceeds that of a 12 weeks' pregnancy.

In connection with the symptomatology it is important to bear in mind the fact that in some cases the first symptoms of the disease are caused by the metastatic lesions rather than the uterine tumor itself.

This has been reported in cases which developed cerebral, spinal and pulmonary metastases. The cystic, deep blue colored, vulvar and vaginal metastatic tumors must be kept in mind when considering the symptoms. Metastases may occur in the lungs, vulva, vagina, uterine appendages and ligaments, liver, kidneys and urinary passages, and in the central nervous system.

An interesting concomitant condition is the cystic change in the ovaries in a goodly percentage of cases of chorioepithelioma, which has been placed as high as 91 per cent when the ovaries have been examined microscopically.

The diagnosis of chorioepithelioma is at times extremely difficult. If irregular uterine bleeding occurs after the thorough removal of an hydatid mole malignancy is immediately suggested. If, however, the disease develops after abortion or pregnancy at term obvious difficulties surround a diagnosis. Recourse to the curette and microscope will usually be necessary to clear up such situations.

The prognosis is difficult to make with any degree of certainty because of the irregular clinical course of the disease. Spontaneous recoveries in apparently hopeless cases have been reported both with and without operation. Schlangenhoffer has reported such recoveries following spontaneous expulsion of the tumor from the uterus, after removal by the curette and by spontaneous regression after a partial removal in cases which showed histologic pictures identical to those in the most malignant form of tumor. Fleishman has collected seven cases in which recovery occurred following probable pulmonary metastases with hemoptysis while Schmauch has called attention to a larger group of 13 cases in which recovery resulted after vulvar and vaginal metastases. It is to be remembered, however, that recovery in cases in which there are pulmonary metastases with cough and hemoptysis is the rare exception and not the rule. The prognosis where there have been vulvar or vaginal metastases is somewhat more hopeful. Teacher's article contains interesting statistics on the mortality in chorioepithelioma in connection with the form of pregnancy which preceded.

PRECEDING CONDITION	TOTAL	DEATHS	RECOVERIES	% RECOVERIES
Hydatid Mole	73	39	34	46.6
Abortion	59	38	20	33.9
Labor at Term	49	39	10	20.4
Tubal or Ovarian Pregnancy	7	5	1	—
Total	188	121	65	34.2

In his series of 188 cases radical operation was performed 99 times with 63.6 per cent recoveries. In the cases operated upon recurrence occurred within six months or not at all with the exception of five cases.



Teacher states, however, that no case should be considered cured until at least two years have passed.

The treatment of chorioepithelioma of the uterus, once such a diagnosis has been made, is complete abdominal hysterectomy, with excision of any vulvar or vaginal metastatic tumors. Radium has given temporary relief in a few inoperable cases.

The treatment of hydatid mole and the course to follow after its removal is, on the other hand, open to argument. The usual procedure consists of a removal of the mole through the cervix either by hand or curette, and vigilance for any future irregular uterine bleeding which, if it occurs, is to be followed by a curettage for diagnosis. If the microscopic examination reveals suspicious tissue, a complete removal of uterus and appendages is done. Vineberg takes exception to this procedure and suggests vaginal hysterotomy for the thorough removal of the mole. If any irregular bleeding occurs subsequently, panhysterectomy is done without a secondary curettage for diagnosis. He claims that the chances for metastases are lessened by this method of treatment. Some have even suggested the complete removal of uterus and appendages in every case in which a hydatid mole has occurred.

The record of the case personally observed, is as follows:

Mrs. K., History No. 23087. Admitted to Woman's Hospital, July 17, 1919. White, aged twenty-three, married. Came to hospital for the relief of slight continuous uterine bleeding since June 12, 1919, and a continuous dull pain in right lower quadrant of the abdomen.

*Family History.*—Unimportant. The patient had always been in excellent health until June 12, 1919, when the present condition was first noticed.

*Menstrual History.*—Onset at thirteen years. Periods have always been regular and of a 30-day type. The duration of the flow has been from 5 to 6 days. Amount moderate with severe pain during the first two days of each period. There has never been any irregularity, except the amenorrheas incident to her former pregnancies, until the present metrorrhagia appeared.

*Marital History.*—The patient was married five years ago and became pregnant one year later but aborted spontaneously and completely at the third month. Full term children were born three years and one year ago. The pregnancies, labors, and puerperia were, according to the patient's statement, normal. Following the last pregnancy there was a period of three months during which the patient did not menstruate but from November, 1918, to April 23, 1919, when the last regular period occurred, the periods were normal.

*Present Illness.*—From April 28, 1919, until June 12, 1919, forty-five days, there was an amenorrhea which led the patient to believe that she was pregnant. On June 12 slight continuous uterine bleeding began and continued until admission to the hospital on July 17, 1919; the bleeding, therefore, had extended over a period of 36 days before admission. For the past three weeks there has been dull moderately severe pain in the right lower quadrant of the abdomen. There were no other symptoms.

*Physical Examination.*—Physical examination reveals a well-nourished woman of about five feet, four inches in height, 175 pounds in weight. Blood pressure: systolic, 128; diastolic, 80. Blood picture and urine normal. Wassermann reaction negative. The head, neck, thorax and extremities show no abnormality. Abdominal examina-

tion is negative except for the presence of a symmetrical uterine tumor the size of a five months' pregnancy. The examination of the genital tract shows a symmetrically enlarged uterus the size of a five months' pregnancy which has a boggy consistency. The adnexa are normal to palpation. The cervix shows moderately deep bilateral laceration, endocervicitis and erosion and is patulous. The pelvic floor is lacerated. The vaginal walls are relaxed and the vulva gapes slightly.

*Diagnosis.*—Upon the history of amenorrhea, the unusual consistency and the size of the uterus which was out of all proportion to the period of amenorrhea, an hydatid mole was considered.

*Operation.*—July 19, 1919, dilatation and curettage were performed under gas-

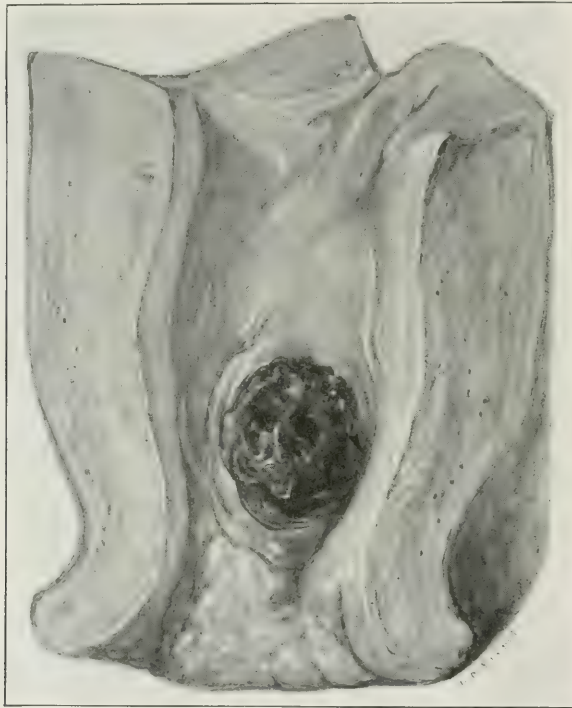


Fig. 1.—Gross appearance of the tumor upon opening the uterus; showing sharply localized hemorrhagic and necrotic area.

oxygen anesthesia. An hydatid mole was removed and the uterine cavity packed with iodoform gauze to control moderate hemorrhage.

*Pathologic Examination.*—*Macroscopic:* An hydatid mole which when spread out covered an area about the size of a full term placenta. There are several small blood clots mixed with the vesicular portions. The villi consist largely of hydropic vesicles from 0.5 to 1.5 cm. in diameter, rather globular in outline. Between are villi of delicate and normal structure attached to fibrous strands constituting the framework of the placenta. *Microscopic:* Several sections show a large number of hydropic villi with a double epithelial layer on the surface. There is a large amount of free trophoblast but very little syncytium present. Nothing in the sections would indicate malignancy.

*Pathologic Diagnosis.*—Hydatid mole of the placenta.

The patient was discharged from the hospital on the fourteenth day free from

hemorrhage and pain, with the cervix closed and the uterus partially involuted. She was warned to return for follow-up observation but could not be induced to do so. On December 15, 1919, four months after discharge from the hospital, she returned to the Out-Patient Department of her own accord and stated that she had been bleeding slightly and continuously from the middle until the end of August; in September, toward the end of the month, there had been four days of slight bleeding; no bleeding of any sort in October but on November 23, 1919, slight continuous bleeding had appeared again and had continued until admission to the hospital on December 15, 1919.

A careful general physical examination showed conditions identical to those that existed when admitted previously. The pelvic examination revealed a symmetrical uterus approximately twice the size of the normal one, and softer than normal, in a partially retroverted position and freely movable. The cervix was slightly patulous and from its canal flowed a slightly bloody discharge. The appendages were normal to palpation. The pelvic cavity contained nothing abnormal. The vulva and vagina were as previously described. The blood and urine were normal.

*Diagnosis.*—A tentative diagnosis of chorioepithelioma was made and a diagnostic curettage decided upon.

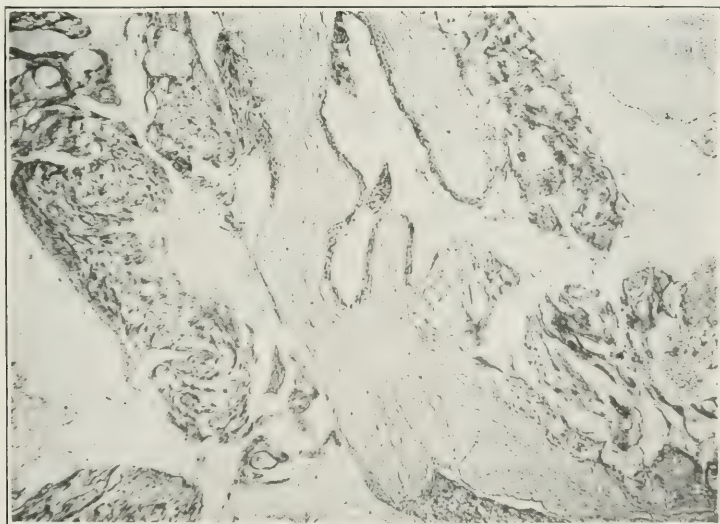


Fig. 2.—Section of curettings removed for diagnosis. Broad septa of connective tissue covered by chorioectodermal tissue. In places this is low with few layers of cells, but suddenly it forms large masses of trophoblasts with rapidly multiplying cells.

*Operation.*—On December 18, 1919, dilatation and curettage were performed. Upon placing a sound in the uterus its depth was found to be four inches. Upon the posterior wall of the uterine body the curette struck an elevation from which a specimen for microscopic examination was easily obtained. The curettage had to be quickly finished because of the profuse hemorrhage which was controlled by iodoform gauze packing. The microscopic examination showed fibrin and blood clots containing a number of distorted uterine glands of indefinite character, with masses of necrotic tissue containing large cells (syncytial wandering cells). A seminecrotic membrane carries papillary cell masses composed of solid buds of trophoblast with syncytial giant cells. Certain wide sinuses filled with blood contain small, densely packed cells of chorionic character. (Fig. 2.)

*Pathologic Diagnosis.*—Chorioepithelioma of the uterus.



*Operation.*—On December 31, 1919, an abdominal complete hysterobilateral salpingo-oophorectomy was performed. The uterus with both adnexa, measured 9x6x4 cm. Cervix, lacerated. Uterine mucosa, thickened, velvety and pale. At the level of the internal orifice, on the posterior wall is a fungoid growth of about 2 cm. in diameter, sharply defined towards the normal mucosa. (Fig. 1.) This node is grayish brown, very soft and penetrates deep into the musculature. The tubes are thin and straight. Both ovaries are slightly enlarged and they both contain hemorrhagic cysts of 1 cm. diameter each. One ovary contains a corpus luteum in the state of development and hyperemia. The other ovary contains several atresic follicles. The cortex contains Graafian follicles. The mucosa of the fundus shows an early premenstrual type. Various sections taken through the tumor with the adjoining musculature show a large clot of blood and necrotic tissue which has been walled off towards the inflamed muscularis of the uterus. The necrotic areas contain numbers of cells of a large type very indistinctly stained. (Syncytial wandering cells.) No sections show any trophoblast similar to that found in the diagnostic curettings and no part of the gross tumor taken shows living tissue. All appearances are those of spontaneous regression.

*Pathologic Diagnosis.*—Choribepithelioma of the uterus. The patient had an uneventful recovery and was discharged from the hospital on the thirty-fourth day in good condition.

*Follow-Up Findings.*—Since discharge from the hospital the patient has visited the follow-up clinic once each month and to date has shown no signs of metastases.

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# Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-THIRD ANNUAL MEETING, ATLANTIC CITY, SEPTEMBER 20-22, 1920

*(Continued from the February issue.)*

DR. JOHN OSBORN POLAK, of Brooklyn, N. Y., read a paper on **The Common Pathologic Lesions which are Classed as Puerperal Infections.** (For original article see page 547.)

## DISCUSSION

DR. K. ISADORE SANES, PITTSBURGH, PENNSYLVANIA.—Puerperal infection of pyogenic bacterial origin begins chiefly as a lymphangitis or thrombophlebitis. When we have an invasion of bacteria in tissues there appears a small-cell infiltration; a protective wall thus forms around the invaded bacteria. The less we disturb this area, the more complete the isolation of the bacteria and the better are the chances for their destruction. If we have a thrombophlebitis, the less we disturb the tissues surrounding the vessels, the greater there is the possibility for the thrombus to organize or absorb, and the less are the chances of formation of an embolus or invasion of bacteria into the general circulation.

The first consideration in the care of puerperal infection consists of putting at rest the parts involved. The patient must not be disturbed by the surgeon or the nurse. Intrauterine treatments of any kind seem to us unsafe. Such treatment as described by the essayist is bound to disturb the uterus, the protective infiltration around it, or the thrombotic blood vessels directly or indirectly connected with it.

For a number of years we have been enforcing absolute rest in treating this class of patients, prohibiting examinations, keeping them as quiet as possible and explaining to them the dangers of violent movements, treatments and examinations.

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—So far as I know, it is almost the prevailing technic to deliver the placenta immediately. After its delivery, the uterus is pushed down by the hand over the abdomen, causing the descent. If the retraction and contraction of the uterus is desirable, this common practice is, and must be wrong, and militates against the condition that Dr. Polak has so ably called our attention to as necessary.

DR. E. GUSTAV ZINKE, CINCINNATI, OHIO.—If there is any one subject that is not perfectly understood, even by the majority of obstetricians, it is that of puerperal fever. Puerperal fever is always an infection, but the infection is not always the same, and much depends upon when and where the infection takes place after labor.

Dr. Polak said that sapremia has been virtually disregarded. I do not believe that statement is quite true, and, if it is true, I do not think it is wise. It is

of the greatest importance to know whether you have a sapremic infection or a septic infection. The difference between the two lies in the fact that a sapremic infection is due to the germs of decomposition. The germs of decomposition live upon dead matter only, and they thrive only on dead organic matter, while the septic germs, the streptococci, attack living tissue at once. They penetrate immediately the wounds within the parturient tract and enter the system either directly or by way of the blood vessels or the lymph channels.

Here is a point of differential diagnosis between the two; in order to make it emphatic and impressive, I shall take the extremes between the two infections. A sapremic infection may exist when the physician and the patient do not even suspect it, or when the patient manifests no very striking symptom. The pulse remains good for several days; the temperature hardly rises in the beginning. Gradually the pulse begins to be more frequent; the temperature rises and fluctuates between 100°F. in the morning and 101°F. in the afternoon. If there is no relief, both temperature and pulse go up, and at the end of a week or more you may have a profound putrescent endometritis, though still sapremic in character,—a condition which promptly yields to treatment if the uterine cavity is gently flushed, as Dr. Polak so graphically described. A sapremic infection is borne comparatively well even by patients whose condition has been weakened by other factors. A streptococcus infection, however, is an entirely different affair, and no matter whether the patient is weak or strong, the outcome will depend upon the activity of the septic germs and the time of entrance into the uterus, especially the placental area. The patient may have presented the appearance of a perfectly satisfactory condition in the morning; in the afternoon or evening you find the picture of apparently perfect health entirely changed. She looks as though she had been stabbed in a vital place. Her face is pale and pinched; she is frightened and seriously apprehensive; she knows she is very ill. She has had a chill lasting probably half an hour or an hour, with a consequent rise in temperature to 105-106°F., or even higher. That is the difference between the two principal varieties of puerperal infection.

A sapremic infection, when recognized early, yields to treatment very promptly; a septic infection does not respond readily to treatment. Even intrauterine irrigations amount to naught, because the germs have penetrated the necrotic tissues and attacked the living structures beneath them. They have entered the system; and, in some instances, produce a phlegmasia alba dolens, in others, a para- and perimetritis, with or without abscess formation, and in still others bacteriemia. Many times there occurs a mixed infection; but in all cases the streptococci predominate.

When particles of placental tissue or membrane are known to be present, they ought to be removed. How are we to remove them? We must not forget one thing,—that Nature in all these cases establishes her own method of defense. We have within the uterine cavity the dead superficial part of the endometrium beneath which lies its deep and healthy structure; between the two, Nature erects the wall of leucocytes which opposes the entrance of all kinds of germs. If sufficient time has passed to give Nature a good opportunity to finish the wall of protection, even the streptococcus will have a hard time to penetrate this bulwark. If a curettement is contemplated, whether you intend to use the finger or the curette, great care must be taken not to disturb Nature's own defense, the wall of granulations. Much, therefore, will depend upon the time when infection takes place. If it occurs early, the case is much more grave than if it takes place after four or five days, when the uterus is well contracted and the wall of granulations more or less complete.



DR. POLAK (closing the discussion).—In regard to the point brought out by Dr. Davis, I think all of us have adopted in the last few years the method of allowing placental delivery to take place by itself without the expression of the placenta.

Sometime ago I presented a paper, as some of you may remember, on spontaneous delivery of the placenta in 2000 cases, and in those cases we found that the placenta came away of itself without any expression if it was allowed to separate under the stimulus of the uterine contractions.

In regard to Dr. Zinke's point of the difference between sapremia and streptococcus infection, I did not make it very clear because I feel that sapremia is only an exaggeration of the normal exfoliation of the endometrium, and that the dead material is infected by the bacteria which have come up from the vagina. But since we have been making anaerobic cultures we have found a large number of these uteri that had been potentially sterile were of the saprophytic type, and contained the obligate anaerobic streptococcus which, under proper environment, may become an active streptococcus. In our own cultures made from the interior of the uterus, at forty-eight hours, five days, and seven days after labor, we found that about 50 per cent of the uteri cultured contained streptococci after the first seventy-two to ninety-six hours; yet at the end of a week these same uteri were practically sterile of this coccus, particularly if they ran an aseptic temperature, showing that the uterus in its development of the granulation zone will develop an antibactericidal action; consequently we feel, if it is capable of doing that by the formation of this leukocytic wall, all it needs is drainage. Stimulation of the proper contraction and retraction produces a Bier congestion of the uterus. Sampson's descriptions and pictures show how dangerous it is to attempt cleansing the relaxed uterus of its contents.

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DR. IRVING POTTER, of Buffalo, N. Y., presented a report on the **Results of His Method of Version**. (For original article see page 560.)

#### DISCUSSION

DR. ROSS McPHERSON, NEW YORK CITY.—Everybody that goes to Buffalo and sees Dr. Potter's work comes back convinced that there is a good deal in his method. I know of at least half a dozen surgeons who in the last year or two have visited Buffalo, have seen Dr. Potter operate and have all become convinced that he has accomplished a great deal with his work.

In view of the number of cases which Dr. Potter has reported, this Association should begin to manifest something else besides a critical and destructive attitude towards his work. When you eliminate the cases which have died from other causes than the delivery, his stillbirth figures compare very favorably with those published elsewhere.

I have tried two or three versions on the plan Dr. Potter has outlined and I confess that the shoulder delivery has appealed to me tremendously as I have always delivered the other way.

I have been skeptical as to the results in regard to perineal laceration but in a case I had day before yesterday, a primipara, the baby weighed nine pounds and there was insignificant laceration. I have never before succeeded in doing version without making a regular laceration which required considerable repair and I have been amazed at the satisfactory results where the vagina is thoroughly dilated and delivery is done slowly.

I wish Dr. Potter would tell us more about the delivery of the aftercoming head, for this is a very important point and I hope that he will show us how he proceeds with the aftercoming head as soon as the arms and shoulders are delivered.

I do not believe however that we can trust every general practitioner doing obstetrics to perform this operation, because the minute this practitioner gets to manipulating the interior of the uterus and doing internal podalic versions, he will not only rupture the uterus and have infections, but will also have an increased mortality among his babies. I do think, however, that if every one who is doing operative obstetrics, will go to Buffalo and see Dr. Potter work and learn how he does his operation, he can get a great deal of valuable information and improve the results he has had in versions in the past.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—For four years I have opposed Dr. Potter's teaching and I am still of the same opinion. However, through the kindness of Dr. Potter I had the opportunity of witnessing two versions performed by him. Since then my reason for opposing his teaching became still greater because I found Dr. Potter to be a master in obstetrics and I dare say that there is no one in any lying-in hospital in the United States that knows how to perform versions so well as Dr. Potter. I honestly believe that it is still a dangerous procedure to be applied by the average obstetrician in any of the lying-in hospitals.

What Dr. Potter can do very few of us are able to do as far as version is concerned, but I do want to reiterate that this procedure must not be made light of otherwise it will be undertaken by those not competent to perform it.

DR. HERMAN E. HAYD, BUFFALO, N. Y.—You cannot imagine how pleased I am to hear the obstructionists endorsing the excellent work of Dr. Potter which they saw in Buffalo, some of the results of which he presented to the Association some years ago. At that time, as many of you know, his statements were questioned and he was thought to be not only unscientific but dishonest.

It seems to me it is an absurd position for Dr. Rongy to take when he says that even a skilled and experienced obstetrician cannot do this work as well as Dr. Potter. I will admit that with such an arm as Dr. Rongy has he will not be able to do it as well as Dr. Potter but yet he will do it without danger to mother or child.

When we go to witness the Mayos operate, or to see Dr. Crile operate, we see the masters and yet many of us do some of our operations in the abdomen just as well and as skillfully as Dr. Crile and the Mayos do them. You can do this operation of version well if you go to Buffalo and learn how to do it properly. It is absurd to say that Dr. Potter has supernatural powers. He has simply had a lot of experience and he is just as skillful in doing version as Dr. Crile is in doing thyroid operations. Dr. Crile may beat me in doing a thyroid operation, he will beat me in time and in technic, but my patients all get well the same as his.

Just think of it, gentlemen, in the city of Buffalo we have about 13,000 children born every year. We probably have over 800 doctors, besides all the midwives, and yet Dr. Potter delivers over one-thirteenth of the babies born in Buffalo. You can hardly believe that, but he has shown by his records that there is nothing better in the whole world. Last year he did not have a death; this year he has had two deaths, one of them with pneumonia after the woman left the hospital, and another one forty days after delivery with some kind of infection. There is no record in the world of which I am familiar that can touch it, and what is the explanation? The explanation is, first of all, sepsis; second, profound anesthesia; third, no traumatism to a latent gonorrheal pus tube; no injury of any of these tissues that produce infection that will go on for two or three or five or six weeks. There is the elimination of pain; a certain amount of individual recreation to the obstetrician so far as the work of obstetrics is concerned. Of course, when I say recreation, I mean that he can do this work

just as you and I do an operation. When a patient is in labor he makes an examination, and from his experience he knows in half an hour whether dilatation will be sufficiently advanced and then he can make the necessary delivery.

It has been said that this must not be taught in an Association like this, it will do harm. I do not think it will do any more harm than when you teach students the way to do abdominal section and because a thing may have some evil attached to it we must not lose the good it may have also. The ordinary doctor is not supposed to do this kind of work, and he does not do it and he cannot do it, but that does not militate against a first-class, trained man doing it. Yes, we have in our Association a man, who is the only man that has ever brought anything new in obstetrics in the last fifty years, outside of aseptic surgical practice.

DR. E. GUSTAV ZINKE, CINCINNATI, OHIO.—When Dr. Potter presented his first paper, five years ago, there was not a man present who supported him in his practice, and it was very hard to restrain the members from having him expelled from the Association. There is no rule without an exception. I am the exception in this case, for Dr. Potter taught an old man a new trick. While I did not believe everything he said at that time, I did not think he was lying, for the manner in which he presented the subject was so impressive that any man who had listened to him attentively felt he was sincere, and I asked the members to deal kindly with him; to wait and see. I went to Buffalo, therefore, to observe him at his work. He performed several versions in my presence, and did them most skillfully and successfully. He is able to teach the younger men how to do his work, and there is where lies his chief merit. Think of a man's delivering 1100 women, personally, within a year! That is a marvelous accomplishment in itself. Of course, we must not forget that he lives in his automobile; he sleeps upon the floor in the patient's home; he rests almost anywhere, in any position, under all conditions. He is devoted to his patients and to his practice. It is the duty of every man who attends to the practice of obstetrics, and who intends to practice it in the future, to see Dr. Potter while he has an opportunity, for we never know how long Dr. Potter may last, and his method of practice should not be lost. It is undoubtedly of benefit to suffering womankind. It helps the obstetrician; it saves suffering; it saves lives.

DR. WILLIAM G. DICE, TOLEDO, OHIO.—I do not dread breech cases as I formerly did, especially cases of extended arm, after seeing the work of Dr. Potter and with what ease he manages the arms. Delivery of the extended arm is now made by me in accordance with the method he has described.

I think it would be of interest to those here, because he has undoubtedly taught a number of men, if he could give us definite statistics of the work of these other men which would possibly throw some light on the ability of those less skilled to do this work.

A question which has come to my mind is that I see rupture or bursting of the membranes early in labor, and frequently before labor begins, and of course we have then a different situation with which to deal. I simply wish to ask in regard to these cases of dry labor, whether he has any greater difficulty in dealing with them.

DR. JAMES A. HARRAR, NEW YORK CITY.—I would like to emphasize a few things, the omission of which may have been noticed by those of you who have seen Dr. Potter work. First, that he uses his left arm in going after the feet, no matter how the baby lies; second, the extreme deliberation with which he makes the breech extraction. It is a continual glacial-like movement of the child. You see not one inch being born instantly; third, the pressure of the rigid fingers of the external hand just above the symphysis and below the uterus digging in to deliver the head through the brim; and last, the gentleness and unconcern with which he handles the newborn child. The babies are not spanked or tubbed. He strips the pharynx ex-



ternally, lays the baby down and turns to the management of the mother. In seven or eight or ten minutes the baby begins to whimper and the spectators breathe more freely.

DR. POTTER (closing the discussion).—I feel I owe a great deal to Dr. Zinke and Dr. Hayd for the manner in which they have discussed this operation. The first time I heard Dr. Zinke discuss this subject I thought he would have a stroke of apoplexy, and I thought I would be hanged for murder. (Laughter.) Since the Indianapolis meeting we have been doing versions more frequently each year.

Dr. McPherson spoke about the delivery of the aftercoming head. There is a maneuver that is of great assistance. After the shoulders are out, the operator puts the first two fingers of his left hand in the child's mouth, and with his right hand above the mother's symphysis aids flexion of the head, and makes what pressure is necessary on the aftercoming head, but we never make pressure on the aftercoming head until the shoulders are out. We do not get the arms over the head. We do not get any locked shoulders. I do not know anything about that, although other practitioners say that they have it and why do not I get it? It is because they push the head down between the shoulders, the head being a movable body goes between the shoulders and up go the arms, and then you have extended arms every time. You should get the shoulders out first and the head flexed in the pelvis and guide with your fingers in the child's mouth. If there is any assistance needed, I now have my anesthetist help with the aftercoming head. With gentle pressure from above, the head now passes through the pelvis, being guided by my fingers in the child's mouth. If it is necessary, I put forceps on to raise the aftercoming head and finish the delivery with forceps.

One man who has seen me do this work has done a hundred and fifty of these versions without any difficulty in the past year. Another has done 121. I presume there are others who have done fully as many without any trouble. Many practitioners are doing this operation in their various localities.

Dr. Rongy said it should not be taught. It has been taught to these men, and I do not hesitate to say it can be taught to competent men.

So far as Dr. Dice's remarks are concerned, he must not lose sight of the fact that a breech presentation is a different proposition from a version. In a version we have flexion, and when once we lose flexion we are lost; when we have a breech, we get the head extended. In version we maintain flexion.

As to the point made in regard to rupture of the membranes, I do not think that is any bar to version. If the uterus is relaxed under anesthesia so I can lift the head up, I perform version. I use my left hand in the uterus because it is easier for me. Slowness is a matter of necessity. The time it takes to do this operation is variable. In some cases I have been twenty-three minutes in delivering the baby. We do not spank the child; we do not put the child in cold water. I use a small catheter in the larynx for resuscitation, and start with a little manipulation of that catheter, pressing the air out. That is seldom done, however.

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DR. EDMUND D. CLARK, of Indianapolis, Indiana, read a paper on  
**Fibroids of the Ovary.** (For original article see page 603.)

#### DISCUSSION

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—I was not under the impression that ovarian fibromata were as rare as the doctor stated. Ovarian myomata, however, are very rare. It has been very difficult for me to decide

whether solid ovarian tumors which answer the description of fibromata were made up entirely of connective tissue or also contain some smooth muscle tissue. Recently I have observed three very interesting cases of fibroma of the ovary. In one instance a very large tumor about the size of a grape fruit arose from the ovarian ligament, slightly stretching the lower pole of the ovary. Directly opposite the site of the normal ovary on the surface of the tumor was a papillary excrescence which on section proved to be normal ovarian tissue. The structure of the tumor for the most part was connective tissue, but there was also definitely present some fibers of smooth muscle tissue.

Another case was a fibroma of the ovary about the size of a hen's egg which was definitely encapsulated. The surrounding ovarian tissue, very much thinned out, served as the capsule.

A third case was a small pedunculated fibroma arising from an otherwise normal ovary. The tumor measured 10x5x4 mm., and was similar to the normal ovarian cortex in structure. This case represented a fibroma in a very incipient state.

DR. ARTHUR T. JONES, PROVIDENCE, RHODE ISLAND.—I should like to add one more case of fibroma of the ovary to the literature. I think many of these cases are confused with sarcoma of the ovary. The first case that came to my notice I diagnosed as fibroma of the ovary. In that instance the pathologic examination proved it to be a sarcoma. Since then I have had five cases of which I have made note. In my opinion it is hard indeed to differentiate grossly between sarcomas and fibromas. This case that I diagnosed grossly as one of sarcoma, on pathologic examination proved to be a pure fibroma.

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DR. JAMES F. BALDWIN, of Columbus, Ohio, read a paper entitled **Some Indications for Hysterectomy**. (For original article see page 609.)

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DR. ADAM P. LEIGHTON, JR., of Portland, Maine, presented a further report on the administration of **Corpus Luteum Extract**. (For original article see page 613.)

#### DISCUSSION ON PAPER OF DR. LEIGHTON

DR. SAMUEL W. BANDLER, NEW YORK CITY.—Every paper which deals with the endocrines is a contribution whether it carries with it a theory or ideas contrary to a theory. If anything makes a man realize that the human body, as well as the human mind, is a complex organism, the treatment of which cannot be guided by any definite rule, it is the study of the endocrines. What will help one thing will not help another. There are certain rules we ought to follow and this paper mentioned something about the ovarian extract. I will be brief and simply state my own opinion with due deference to the experience of others. I use corpus luteum extract more frequently than ovarian extract or ovarian residue. Dr. Leighton uses corpus luteum with menorrhagic symptoms occurring at any time, especially at or preceding the menopause. The theory is that ovarian extract or ovarian residue stimulates menstruation, whereas corpus luteum extract inhibits or delays menstruation, and it acts as effectively as placenta extract does in making menstruation late. We know that the thyroid swells a few days before menstruation, and that it enlarges enormously and to the patient's benefit during

pregnancy. The thyroid gland has a specific effect in menstruation, and in nidation of the ovum it has a specific effect in keeping the ovum where it should be and limiting the overcontraction of the uterus so as not to end in abortion. Most of the miscarriages occur at the menstrual period. The average woman tries to menstruate all during pregnancy, but is inhibited wholly by corpus luteum and placental extract and thyroid. All three hold the posterior pituitary, which acts when the woman is in labor, in check. If they do not hold the posterior pituitary in check, pregnancy goes on until the fourth or sixth month, and we call it a miscarriage. The corpus luteum stimulates thyroid activity before menstruation and still continues to stimulate it normally during pregnancy. If the thyroid is not stimulated during pregnancy, the toxemia of pregnancy, with involvement of the kidneys, comes about. I am almost prepared to state that a young woman with a very good thyroid never or rarely has a dangerous toxemia of pregnancy. So you have the thyroid and corpus luteum and placental extract acting in opposition to the pituitary. The time when corpus luteum would seem to be of the greatest benefit is in or about the menopause, because there, after all, you are dealing more with menstruation practically *in toto* by interrelation among the glands than at any other time. Even flushes and flashes at the menopause period are due more to overactivity of the posterior pituitary than to any other one thing, and since corpus luteum does oppose the posterior pituitary, it is the logical one to use. However, it will act in some cases where it will not act in others at all. In still other cases the whole ovarian extract or the placental extract, will not act. Absolutely nothing acts.

I saw for the first time a journal printed in German about two weeks ago in which a man reported the effect of the various endocrine glands on menstruation, and he tabulated 150 cases by one man who used corpus luteum for one purpose, and 150 cases in which another man used it for a totally different purpose, and both were eminently satisfied with their results.

DR. JAMES E. KING, BUFFALO, NEW YORK.—I think Dr. Leighton's contribution to this subject is a very valuable one because he has put it before us in a judicial and very sane way.

Dr. Bandler's closing remarks, it seems to me, cover the situation pretty well regarding the administration of these remedies, because I think our enthusiasm in any line of endeavor tinctures our opinion as to the results obtained. Personally I feel that in so far as ovarian extract or corpus luteum is concerned in therapeutics, they are very uncertain agents, so uncertain that I believe every time we administer these remedies we are doing it empirically and simply as an experiment. The only endocrine substance I have been able to give and have been able definitely to say beforehand I was going to get results, is thyroid extract to control bleeding in women approaching the menopause, in whom there are symptoms of a mild myxedema. In these cases only have I been able to feel I could say definitely I was going to get the result I expected.

In regard to corpus luteum and ovarian extract, I have never been able to say with any degree of certainty that I was going to get the results looked for, and that is the experience of Dr. Bandler who was really the first to emphasize the point. I think Dr. Leighton's work has contributed a great deal toward that end. Much of what we know about the endocrine system has come from therapeutic endeavors to correct the pathologic effect of the glands and a better knowledge of their physiology.

DR. GREER BAUGHMAN, RICHMOND, VIRGINIA.—One word in regard to the use of the corpus luteum in the vomiting of pregnancy. When Dr. Bandler said a thick necked woman is a safe pregnant risk, he has said a very important



thing. Hypersecreting thyroid is one of the things I look for in a pregnant woman. If she has a thick neck I feel comfortable about her pregnancy so far as toxemia is concerned.

The only change I have made in the treatment of the vomiting of pregnancy has been the addition of corpus luteum to my plan, and since I have been using it, I have had only one case, who could vomit at will, that had to be aborted on account of vomiting of pregnancy.

Whether corpus luteum has done the work, or whether it has been my good luck, I do not know.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—The only really good results that we see from the use of corpus luteum are in those cases which suffer from habitual abortion. I have had one woman who has been pregnant seven times and has never succeeded in carrying a child up to the point of viability. Others are those cases who give a history of abortion three or four or five times, and in whom everything else is eliminated. Those patients, if put on corpus luteum injections sufficiently early during pregnancy, have a chance of carrying the baby to the point of viability. I have had three such cases this year.

In regard to the use of corpus luteum in the early vomiting of pregnancy, I tested it out, and when the first report came out I was enthusiastic about it, and placed the patients in the hospital under proper surroundings, with proper care and proper nursing, and some of the cases responded very well, but only for a time. In a great many cases we did not get any results at all from the corpus luteum extract. Whether Dr. Hirst uses a different preparation or not, I do not know. I am not very enthusiastic about the use of corpus luteum extract in the early vomiting of pregnancy, but it seems to produce marvelous results in cases of habitual abortion.

DR. JAMES E. SADLIER, POUGHKEEPSIE, NEW YORK.—Stimulated by Dr. Leighton's paper of five years ago read at the Indianapolis meeting of this Association, I proceeded to give corpus luteum a further trial in the peculiar phases of the climacteric. I must say that in quite an extended experience with organotherapy in that particular phase, I have had fully 75 per cent good results. In certain cases bordering on practical psychoses, I have seen splendid results, and I quite approve of what Dr. Leighton said with reference to the long-continued use of it. Its temporary or transient use does not seem to produce effects, but continued over weeks and months, I have obtained satisfactory results. I have had no experience in combining it with the thyroid extract.

DR. HERMAN LORBER, NEW YORK CITY (by invitation).—I wish to call the attention of the Association to a combination of ovarian extract or corpus luteum with other endocrines in cases of sterility. Dr. Bandler has reported 130 cases. Not many of us have had such an extensive experience as he has. However, a few of us who have tried ovarian extract in combination with other thyroid or pituitary depending on the individual case, have seen marvelous results in many cases of sterility where all other medical or surgical means have failed. In not a few the administration of only a few capsules of the drug has proved of value.

DR. LEIGHTON (closing).—While I will grant that the paper just read, is incomplete, I do get results, and I am not afraid to make that statement! I will admit that it is hard to explain physiologically in many of the cases why one obtains results, and I wish it were possible for me to make a true explanation.

To obtain satisfactory results, we must have a fresh product, a point which unfortunately is not sufficiently considered. People go around to drug stores and

buy tablets which have been dried up or become damp. They cannot expect to have good results by using such a deteriorated product, and that is why they get toxic symptoms. The treatment must be prolonged. Many times men become discouraged if they do not notice results after short treatment. They have been told emphatically they must prolong its administration and yet they have often given up treatment at a time when they would see good results if they persisted. I have a great deal of faith in luteum extract in the early menopause symptoms and it is especially necessary to "get the patient under control." As I stated previously, the longer the neuroses of the climacteric have persisted, the more difficult it is to alleviate these distressing symptoms through the medium of this type of organotherapy. Regular, continuous ingestion of a fresh product of luteum extract is needed in any case where ovarian hypofunction is present, and in my experience, this substance must be taken for a couple of months, anyway, before satisfactory evidence of its action is shown, or its failure is assured.

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### OBSTETRICAL SOCIETY OF PHILADELPHIA. MEETING OF NOVEMBER 4, 1920.

THE PRESIDENT, DR. EDWARD A. SCHUMANN, IN THE CHAIR.

DR. ALFRED C. BECK, of New York, read by invitation, a paper on **The Advantages and Disadvantages of the Two Flap Low Incision Cesarean Section, with A Report of Eighty-three Cases.\*** (For original article see page 586.)

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DR. IRVING W. POTTER, of Buffalo, N. Y., also read by invitation a paper on **Version.** (For original article see page 560.)

#### DISCUSSION ON THE PAPERS OF DRS. BECK AND POTTER

DR. BARTON COOKE HIRST.—I am very much interested in Dr. Beck's presentation as I think that I was the first to perform the low incision in this country. I saw the European operators do extraperitoneal sections in 1912 and I familiarized myself with the various methods. I do not feel that it is necessary to resort to this extraperitoneal technic in clean cases, results have been so good by the classical method. But in the presumably infected case, not only is the extraperitoneal route advisable during convalescence, but the extraperitoneal operation also is needed. Dr. Beck's technic does not protect the peritoneal cavity from contamination during operation. It is to secure this result that I have tried several procedures. I am not quite satisfied yet as to the very best way of doing it.

I cannot help envying Dr. Potter his opportunity for acquiring skill in the technic of version. I do not suppose anybody in the world has had such an experience as he. I don't think Dr. Potter would advocate the performance of this operation for every practitioner of obstetrics. I cannot conceive of any one advocating the delivery of every woman in the second stage or at the beginning of the second stage of labor by podalic version. Dr. Potter may be able to do the operation successfully, but I

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\*Dr. Beck's first paper on this subject was published in the *American Journal of Obstetrics and Diseases of Women and Children*, February, 1919. The paper presented herewith contains additional case reports and statistics based on observations made since that date.

doubt whether he claims that every practitioner can do so. I do believe we have forgotten the advantages of podalic version. There are many cases in which it might be utilized to advantage, and I think of late years there has been somewhat of a prejudice against it. I believe Dr. Potter's advocacy of his method will revive podalic version, but I would certainly hesitate to advise the delivery of every woman by podalic version.

DR. EDWARD P. DAVIS.—The operation described by Dr. Beck is not an extra-peritoneal operation and it has been abundantly demonstrated that it is next to impossible to perform this operation in a purely extraperitoneal way. When this procedure was first advocated, it was claimed that it was especially adapted in infected and septic cases because the uterus could be drained through this suprapubic incision. I heard nothing from Dr. Beck concerning drainage, except the fact that where suppuration occurred, nature provided drainage by causing the pus to burrow beneath the peritoneal flap. The plan of the operation seems to be to protect the peritoneal cavity and to take for granted such protection will inevitably be adequate. While in the majority of cases this may be true, Dr. Beck has stated that in some patients suppuration occurs and makes its way externally, thus instituting drainage.

As regards the subsequent condition of these patients, it is inevitable that very considerable adhesions should form after the operation. Would not such adhesions interfere with a subsequent pregnancy and might they not disturb the general health and comfort of the patient? In operating upon a patient who had previously had this form of delivery, I found very extensive adhesions, which had caused great pain and had so distorted the birth canal as to make spontaneous labor impossible.

If the usage of different obstetric clinics be compared, it would be observed that cesarean section is more frequently performed for placenta previa than in the past. Would this operation be applicable in placenta previa? While we welcome any procedure or study which may increase the resources of obstetric art, it is necessary to study carefully the precise indications and limitations for operative procedures.

This is not the first time that I have had the pleasure of hearing Dr. Potter describe his method of performing version and extraction. His skill and success in this are evident, but this is one of the cases where it may be asked whether, because one man can do a thing so well, ought this to become general practice? The profession and public are indebted to Dr. Potter for demonstrating the success of podalic version and bringing it anew to popular use. Cesarean section has held the field of late, and it is well that attention be directed elsewhere.

It is interesting to observe that Dr. Potter uses chloroform exclusively as an anesthetic, and that he has failed to become fashionable by the use of nitrous oxide and oxygen. Chloroform has been recognized for many years as the ideal anesthetic for version, but so few at present are skilled and experienced in its administration that its employment has been largely abandoned.

It would be interesting to know whether Dr. Potter limits his performance of podalic version and extraction by pelvic measurements. It has been the custom of European clinics to state definitely that under certain measurements of the true conjugate podalic version and extraction should not be admitted. Does Dr. Potter rely at all upon pelvimetry, or does he estimate the size of the pelvis by palpation when the hand is introduced to perform the operation?

He states that he carries out this procedure to spare a woman pain and distress in the second stage of labor, and this we understand to be the chief reason for his action. His fetal mortality is comparatively high and he must, therefore, consider the comfort and condition of the mother as taking marked precedence over the safety of the child. An analysis of his statistics indicates that he limits his opera-



tive work largely to two operations, cesarean section and podalic version and extraction. He apparently rarely uses forceps and in the absence of spontaneous labor chooses one of these procedures.

We have recently had advanced the claim that as the great majority of women are more or less pathologic and not physiologic, so the great majority of labors are pathologic processes and are to be treated artificially. One writer strongly urges the use of forceps in the great majority of labors. Dr. Potter would employ version and extraction to limit pain and suffering and delay. Is obstetrics reaching the stage where spontaneous parturition will become a rarity? The answer to this question must depend upon a careful study of statistics, reliably obtained.

It is my opinion that Dr. Potter has rendered patients and physicians a great service by calling attention to an operation peculiarly adapted to many cases of delayed and difficult labor. Many patients in whom fruitless attempts to deliver are made by forceps could be more safely and more expeditiously delivered by version and extraction.

DR. RICHARD C. NORRIS.—Dr. Beck has not solved the problem of what operation will save the woman whose uterus is thoroughly and hopelessly infected. Dr. Davis has done that by taking out the uterus. I doubt not that Dr. Davis has taken out some uteri which Dr. Beck and others would not have removed. The vital question is: Is the woman's uterus hopelessly infected? Dr. Beck's tables are very gratifying to us. They show that hopeless infections are relatively rare. We have no scientific, exact method to determine hopeless infection and until we have it is wholly impossible to choose with precision the operation that will avail in suspected cases. In a recent case where craniotomy was suggested, I did Dr. Beck's operation, and the woman is alive and well today. If she had been in Dr. Davis' hands he probably would have taken out the uterus. I have had only 12 cases operated by extra- or transperitoneal methods. The last five or six have been by Dr. Beck's technic. I think his operation is the best one we have of the so-called 'low transperitoneal operations.' It protects the peritoneum and provides extraperitoneal drainage. If the infection is in the placental site and you operate below, you give the woman a chance to combat the placental infection without the added risk of peritonitis by extension through the uterine incision, whereas, in the classical section, if you cut through the infected placental site you expose the patient to a greater risk. Dr. Beck exhibits interesting temperature charts but I am by no means convinced that they prove the point. The temperatures may be due, in part, to the widespread trauma and oozing incident to the technic. We must look to the laboratory to find some way of telling us how serious the individual case may be. We shall not have the proper appraisalment of the low operation until we know that. We cannot settle it by saying that Dr. Beck's method is going to save all infected cases. He does not make that claim. When in doubt I would do the low operation; when I believe the case hopelessly infected I take out the uterus. With our present inexact knowledge each operator must judge for himself and our judgments will vary.

Dr. Potter's infant mortality is about eight per cent. He delivers the anterior arm first. He must have some cases of high arrest of the head with extended arms. Would that be the technic for such cases? How often does he push the head out of the pelvis before version is attempted? How many x-ray pictures has he had taken to prove the absence of fractured arm or clavicle when the head has been high and the pelvis small? With thirty years' experience I find I have to get my fingers inside the uterus to extract the posterior arm. The unsolved problem in gynecology today that confronts the gynecologist is his inability to repair permanently the injuries to the upper pelvic diaphragm. Version and rapid extraction which are often necessary in some obstetric emergency, often the result of too early

interference, are factors producing such injuries. Artificial methods of dilatation of the upper pelvic diaphragm cannot equal nature's method. I am not convinced that extraction done even at the time Dr. Potter elects (and there are some cases that permit no delay), protects that upper pelvic diaphragm from the injuries we know result from rapid labors, from early forceps, from pituitrin, from any manipulation that interferes with or anticipates nature's mechanism of dilatation. I would like to examine Dr. Potter's 900 patients before I should be willing to believe them better off as to their birth canals than after vertex presentations.

DR. GEORGE M. BOYD.—The flap splitting low cesarean operation like other modifications of the classical operation, is suggested by its advocates with the hope that we may thereby minimize adhesions and diminish the danger of infection. If it accomplishes these indications, then it would be the operation of choice, particularly in the case exposed to infection. If the patient is potentially infected, I do not think it is indicated. In these infected cases, the infant is usually dead and does not demand consideration. In such a case it would therefore be better to perform craniotomy. The flap splitting low cesarean operation is more difficult to perform in my opinion, than the classical operation and the infant is not as easily delivered. If these facts are true, then it is essential for the advocates of this procedure to prove their claim that there exists less danger of infection by this method. It will require time to prove that the mortality is lower than that of the classical operation. In 1919, Dr. Beck reported a mortality study of 107 cases operated upon at the Long Island College Hospital. In all, there were six (6) maternal deaths. He deducts two (2) deaths from eclampsia as not coming under the direct province of his paper, leaving 105 cases with four (4) deaths, 3.8 per cent. I have done in all, 104 sections with three (3) deaths. The first and second deaths were due to infection, both cases entering the hospital late in labor. The third death occurred three weeks after operation. The patient had a normal convalescence, was out of bed and ready to leave the hospital when she was suddenly taken with dyspnea and died immediately from a pulmonary embolism. If we deduct this last death, the mortality was two (2) maternal deaths, 1.96 per cent in 103 cases. In these 104 cases, 60 per cent had the test of labor. In many, the membranes were ruptured and labor complicated, in one case by prolapse of the funis and in another by prolapse of the arm. The classical operation, as before stated, was done with one exception, when hysterectomy was performed. We have tried out the several methods of suturing the uterus and believe the safest method to prevent leakage and subsequent rupture of scar, is a through and through suture of fine silk. I believe, therefore, that it will require the test of time to prove out the advantages of the method of operating described by Dr. Beck. My feeling is that as the dangers of cesarean section are due to the condition of the patient at the time of the operation, obstetric judgment for or against section is more important than is the particular method of operating and that the patient potentially infected, will probably die by any method of section.

Dr. Potter presents to us an ancient operation in a new rôle. He has personally delivered eleven hundred (1100) women in one year. This was a gigantic task. In these cases he has made nine hundred (900) versions. He resorts to this ancient operation to cut short the course of normal labor. Obstetrics is a time-consuming specialty. It is not surprising in this day, that from time to time, obstetricians have suggested and defended a method of conducting labor which cuts short its normal length. Ergot and pituitary extract have been resorted to. Manual and hydrostatic dilators have been used. Labor by appointment is suggested. In all of these measures mentioned, interference is carried out early or labor actually induced. Dr. Potter resorts to version as a means of cutting short the normal length

of labor. So that version, as an operation for a special indication such as hemorrhage or faulty presentation, is not the subject for discussion. He resorts to internal podalic version when the first stage is completed or when the cervix is dilatable. If it is harmful to cut short the normal course of labor, Dr. Potter's method in some respects is less dangerous than the methods previously mentioned, because he does not recommend it until the first stage of labor is completed or the cervix dilatable. On the other hand, it is more dangerous, for he advocates for the purpose a major obstetric operation. The chief lesson I have learned in serving the Philadelphia Lying-In Charity for the past thirty (30) years, is that many of the complications and tragedies that we witness today in obstetrics are brought about by too great haste on the part of the attending physician, a tendency to ride rough shod over the principles laid down by the old masters in our art and attempt to solve the problem in the quickest way. While this tendency is in accord with the spirit of the times, I feel that we often invite trouble by attempting to cut short the normal length of either pregnancy or labor. I am in accord with Dr. Potter so far as he resorts to version for a specific indication but do not believe it is good obstetrics to interfere with the normal course of labor by any major operation.

DR. ALICE WELD TALLANT.—I am in accord with what Dr. Norris said about Dr. Potter's fetal mortality of 8 per cent. Ten years ago when I went over our work, including cesarean sections and all sorts of cases, our mortality was not above 5 per cent. We find in our service that women would rather suffer in the second stage and have a better chance of having a living baby.

DR. JOHN A. MGLINN.—Dr. Beck in his paper falls into the usual fallacy of advocacy of this operation in the prevention of infection. He did not speak of the great value of the low incision and the covering over of the wound to prevent adhesions. In considering how these operations may prevent infection one must consider the course of infection. Very few operated by cesarean section die from peritonitis. The operation of Dr. Beck does not protect the peritoneal cavity from the spill. It does, however, protect it from suture infection. Dr. Norris spoke of infection in the high incision. In the low operation you have a point of drainage; drainage cannot escape anywhere except into the uterus. In many of the puerperal infections I take the uterus out because these other operations do not cover the question of infection. We have no method by which we can tell what cases may become infected. I cannot see how this operation will protect if you leave the uterus in.

DR. STEPHEN E. TRACY.—A few weeks ago I was much impressed by a paper on Podalic Version presented to Dr. Potter. Since then it has been my privilege to see him deliver, in one day between 5 A.M. and 5 P.M., six patients by podalic version. There were many things about his work which were striking, and one that impressed me the most was the accuracy with which he could estimate the time of complete dilatation. To illustrate, he called at the hotel one morning about four o'clock, and took us to a hospital, and immediately began to prepare for the operation. When the procedure had been completed, he announced that we would go to another hospital and deliver a patient who was ready. When we arrived at the other hospital, he began immediately to prepare himself for the operation. He invited me to examine the patient and she was certainly fully dilated. About 11 o'clock we saw him deliver a patient at her home. That was the twelfth delivery on that patient, all by podalic version. While her pelvic tissues were greatly relaxed, there had been no frank laceration. With this patient he had slightly more trouble in delivering the head, than with the other patients, really no actual trouble, but it took a few seconds longer than usual to get the head going nicely. About one o'clock in the afternoon, he 'phoned us to meet him at the Children's



Hospital at 3:15 o'clock. At intervals of half an hour, he delivered three patients. The last was a primipara. From the time he started to "iron out" the perineum until the delivery had been completed, and the patient ready to be turned around in bed, a period of twelve minutes had elapsed. After delivery Dr. Potter exposed the parts for examination, and there was no laceration, not even a break, in the mucous membrane in any one of the six patients. The deliveries were absolutely clean. There was not a stain on the Doctor's gown or on the uniforms of the nurses who held the patient's feet, nor in fact on anything. During my short visit, I studied the charts, and saw at least 25 private patients who had been delivered by podalic version. Some of the patients had been delivered a day or two, others were out of bed and ready to go home.

Of these patients, one had a temperature of 100° F. one day, another had a temperature of 99° F. for one day. With these two exceptions the temperature had been normal throughout the convalescence. It was rather startling to see a baby that had not uttered a sound wrapped in a blanket and put aside, but one unaccustomed to this procedure was soon out of suspense, as the babies all demonstrated promptly that their lungs were in perfect working order.

DR. NORMAN L. KNIPE.—Dr. Tracy did not say that Dr. Potter's work is even better on private patients. We saw him deliver eight private patients in two days. He seems to increase his reputation and does not tire himself out by doing a lot of free work. I have been impressed with his gentleness, manual dexterity, and the slowness with which he did the version. I quite agree with the speaker in Atlantic City who said that Dr. Potter had given us the one new thing in obstetrics in the last twenty years.

DR. COLLIN D. FOULKROD.—In my own private practice I find I have fully sixty and sometimes seventy per cent occipitoposterior positions. In our earlier teaching we found a great number of occipitoposterior position patients who required version as the simplest method of delivery.

DR. JOHN COOKE HIRST.—It was my good fortune to deliver two patients in their second childbirth upon whom Dr. Potter had done version, and the pelvic condition of both I would consider absolutely perfect. On neither patient had any repair been done. The blood pressure of one was 240, the parts edematous and badly swollen. This patient was delivered by version in the usually short length of time that Dr. Potter takes. When I saw her in her second childbirth the pelvic condition was most satisfactory. I think Dr. Potter's technic, which can secure such results, is worthy of admiration.

DR. BECK (closing).—Dr. Hirst does not regard this as an extraperitoneal operation in its fullest sense. We do not claim that the operation is extraperitoneal. It is an intraperitoneal operation with an extraperitoneal closure. In twenty-four hours the wound is perfectly sealed by the peritoneum. I know this to be an actual fact because of a death following the original procedure in which the lower part of the broader flap was firmly adherent.

Peritonitis following cesarean section occurs as the result of one of four things. It may occur as the result of faulty operative technic. It may occur as the result of the spill of contaminated amniotic fluid, or by extension of puerperal infection through the lymphatics as is the case in the majority of deaths from peritonitis following delivery from below. This operation does not prevent any of these. The great majority of deaths that have occurred from peritonitis following a classical operation, in our previous experience, occurred as a result of extension through the uterine wound. The uterus was infected and the wound itself broke open. The operation prevents the extension of a puerperal infection by this most frequent route.

Since we have been doing this operation we have had much less care in the selection of our cases for cesarean section. The operation does not prevent infection in the uterus, but we believe it does prevent extension to the peritoneum in many cases. Therefore I feel that our results have shown it to be relatively safe in suspicious cases. As nearly every man has stated tonight, a patient may have been in labor a long time, perhaps has had a number of examinations; we do not know whether she is infected, a certain percentage are. The infected cases we feel have an added protection by the flaps and by the low incision.

With regard to the use of this operation in elective cases, Dr. Polak has been using it routinely from the middle of last year. Every one who has used this operation in a sufficient number of cases has found that there are definite advantages even in elective cases. One advantage is in the matter of hemorrhage. There should be less hemorrhage from this operation because of the fact that the placental site is so seldom in the lower uterine segment. Then again, if we have a tired out, flabby uterus which does not contract and the only way of controlling the hemorrhage is by hysterectomy, we may do the latter very easily after this type of cesarean section.

While we have not opened any of these cases subsequent to operation we feel there are certain advantages when the scar is in the lower uterine segment over that in the upper. The lower segment is passive and healing should take place here more readily. The scar in this operation is in precisely the same area as in the vaginal hysterotomies. We do not often hear of their rupture in the latter. The convalescence following this operation is much smoother than when we used the high incision routinely. I used to do my cesareans according to a technic much as Dr. McGlinn describes. Almost invariably when the patients were reoperated upon, adhesions were found. It seems reasonable to expect fewer adhesions as a result of better peritonization. I doubt very much whether I would suggest this operation in placenta previa on account of the danger of hemorrhage. I have encountered a placenta unexpectedly in three cases. In two there was not a very marked hemorrhage. In the third the bleeding was very profuse.

DR. POTTER (closing).—Dr. Hirst asks whether I advocate version for every one. I don't advocate it for any one if they do not want to do it, but especially trained men in obstetrics should be able to do version just as well as cesarean section. It is for the professor of obstetrics to decide whether he shall teach the men to do version. I don't do version in a flat pelvis. The anterior arm is delivered more easily than the posterior, for some reason which I have not found out. I have not tried using half the forceps, nor have I x-rayed or made inquiries to know whether there were fractures because I did not think it necessary. I know there were none. We have no use for the bags; we do not know what you do with them. I don't believe there are any injuries about what we are pleased to call the upper pelvic diaphragm, and I think the cervix in my cases is higher than it used to be when I didn't do version.

The 1113 women as stated in the paper I delivered myself. In 80 per cent I did version, 13 were footlings; 13 delivered themselves before I could get there; 12 cases were delivered as vertex cases; 3 were face cases. I am glad if you have any fetal mortality not above 3 per cent. I don't know what caused the convulsions in my case; five died from inanition, and that cannot be laid to the method of delivery. There were three monsters.

# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### The Ovary and Its Physiologic Functions

By S. S. SCHOCHET, M.D., CHICAGO, ILL.

THE concept of the physiologic processes of the female genitalia, as generally accepted, has undergone extraordinary changes in recent years. Yet in spite of the great, indeed wonderful progress that has been made during the last two decades, the mysterious function of menstruation and ovulation continues to occupy a prominent place in the thought and problem of gynecologists. Both of these important problems are essentially of a physiologic character, which reflect fundamental laws that have a close bearing upon practical gynecology, as well as on the general problems of biology.

The biologic investigations are largely in the morphologic stage: in the main by reason of the fact, that the morphology offers greater difficulties to an adequate explanation and interpretation than the physiologic processes.

The contributions to our knowledge are mainly pieces or parts of pieces, limited to one phase of the subject, restricted to one portion of the internal genitalia and covering only a meager subdivision. Aside from these fundamental problems, there are the endocrine glands, which in a measure are of more immediate practical interest in regard to questions of development, monstrosities, and sex differences.

#### HISTORICAL

The earliest mention of the ovary is accredited to Herophilus (Alexandria, 300 B.C.) and received its name from Steno in the seventeenth century A.D. (Fasbender).<sup>1</sup>

#### GROSS STRUCTURE

The ovaries are organs which belong to the class of externally secreting glands and ductless glands. The reproductive glands represent a different class from any of the other externally secreting glands, for their secretion-products, although discharged by a duct (fallopian tube) on a free surface, do not merely consist of substances formed in and extruded from cells, but of complete cells (ova) which become detached as such from the ovary that forms them, and are carried away from it along with a fluid (liquor folliculi) likewise produced by the gland. Minot<sup>2</sup> places the ovary along with the organs which produce the erythrocytes and leucocytes under the general head of cytogenic glands.

The ovaries are two small, somewhat flattened, solid-looking ovoid bodies lying one on each side of the pelvis, and projecting into the



peritoneal cavity at the posterior part of the broad ligament, which is itself formed of a fold of peritoneum. The ovaries of different women vary much in size apparently without any relation to fertility. In the nullipara the ovary presents a more or less smooth surface; in older women, it becomes larger, more round and irregular in outline due to the maturation of the follicles. After menopause the ovary shrinks, and in old women, it may be as small as a navy bean and made up chiefly of fibrous and scar tissue.

The surface of the ovary is covered with a single layer of cuboidal epithelium. In very rare instances this may be ciliated (von Velits and Williams).<sup>3</sup> Although it is the direct representation of the embryonic hypoblasts, its function is only protective. It is stated by Bland-Sutton<sup>4</sup> that the ovary is sometimes surrounded with a peritoneal hood, which is the homologue of the *tunica vaginalis testis*; but this statement lacks confirmation by other observers. Graves<sup>5</sup> attributes extraordinary potentialities for growth to this layer and considers this the chief factor in the etiology of parenchymatous ovarian cysts.

It is not the intent and purpose to give a minute and complete résumé of the embryology of the ovary, especially as to parental characteristics and variations, the origin of sex and growth; yet an accurate idea of the structure of the ovary can only be clearly understood by a study of its development.

Although important preliminary contributions were made by Valentine<sup>6</sup> and Pflüger,<sup>7</sup> it was not until Waldeyer<sup>8</sup> in 1870 published his epoch-making monograph upon the ovary and ovum, that a more accurate description of the development of the chick ovary was obtained. He found that the celomic epithelial cells covering the wolffian body became larger and differentiated from the surrounding tissues. This epithelium was designated as germinal epithelium, and its cells soon became differentiated into two groups. The large clear cells or primordial ova surrounded by the second group of small epithelial cells, which extend downward as Pflüger tubules, or egg nests. These are broken up into smaller and smaller masses, until eventually isolated primordial ova are found which are surrounded by a single layer of epithelium. Nagel,<sup>9</sup> Klein and von Franque<sup>10</sup> have observed occasionally more than one nucleus in the primordial ovum.

Recent observations, however, have thrown some doubt on the real site of origin of these cells, for in the elasmobranchii they have been found to be formed by emigration of cells from the yolk sac. This is also true of an early human embryo of 4.9 mm. in length. Ingals<sup>11</sup> has described large sex cells under the peritoneum at the root of the mesentery in the region of the first five trunk segments.

If further investigations should show these observations to be correct, then primitive sex cells must be considered differentiated during the very early division of the fertilized ovum, as is the case in the lower classes of the animal kingdom.

It is entirely unknown to us how the transformation of undifferentiated cells into sexual cells is accomplished. One can observe with the microscope alterations in the structure of the cells, but the cause of this alteration remains a hidden mystery. (Minot).<sup>12</sup>

It would indicate that the ova are not formed in the embryo as a whole but from early differentiated cells of the fertilized ovum. The germ-plasm would be the continuous stream of living substances connecting all generations (Wilson).<sup>13</sup>

Weissmann<sup>14</sup> concludes that protoplasm possesses the property of potential immortality. This latter part of his theory has been the subject of much interesting investigation<sup>15</sup> with some contradictory results. It has been shown by Woodruff<sup>16</sup> that a specimen of paramecium isolated and kept in a varying culture medium during a period of five years "possessed the potentiality to produce similar cells to the number represented by 2 raised to the 3029th power or a volume of protoplasm approximately  $10^{1000}$  times the volume of the earth.

In a later paper Waldeyer<sup>17</sup> (1901) states that the formation of primordial ova was not as simple as he previously described but was a very complex process. This was later confirmed by the work of Nagel,<sup>18</sup> Skrobansky,<sup>19</sup> and McIlroy.<sup>20</sup> The researches of Winiwarter<sup>21</sup> have shown that the changes occurring in the cortical zone derived from the germinal epithelium are of a very complex character.

#### THE MICROSCOPIC STRUCTURE

The general structure of the ovary can best be studied in cross section, when the organ is seen to be made up of two portions—the cortex and medulla. The primordial ova and graafian follicles are situated in this outer layer or cortex. It is composed of spindle-shaped connective tissue cells, throughout which are scattered the primordial ova and graafian follicles in various stages of development. In the most external portion of the cortex there is a single layer of cuboidal cells, resting upon a thin layer of fibrous tissue, which gives the ovary its whitish appearance, and which is called the tunica albuginea.

The medulla is composed of loose connective tissue and contains large numbers of blood vessels, both arteries and veins; and, according to His,<sup>22</sup> Köllicker<sup>23</sup> and Rouget,<sup>24</sup> a considerable number of non-striated muscle fibers, whose presence caused the last named observer to class the medulla among erectile tissues. The exact arrangement of the blood vessels has been studied exhaustively by J. G. Clark.<sup>25</sup>

According to Waldeyer<sup>8</sup> each ovary at birth contains at least 100,000 oocytes, the majority of which disappear before the age of puberty; so that at this time only 30,000 or 40,000 remain. It is explicitly added that this is merely an estimate and probably too low rather than too high. All authorities do not agree on the number of oocytes. Henle<sup>26</sup> estimated the number of follicles in an eighteen-year-old woman and stated that there were not less than 72,000 ova in both ovaries.

Heyse<sup>28</sup> employed a more exact method and concludes that the number of follicles in both ovaries is 35,200. Sappey<sup>28</sup> determined the number of ova in each ovary as 300,000.

The most recent contribution is that of v. Hansemann<sup>29</sup> with the tabulated results of Hayato Arai.<sup>30</sup> He gives the number of ova in one (?) ovary of man at different ages as:

1 to 2 years	48,808
2 to 5 years	46,174
5 to 6 years	30,339
8 years	25,665
10 years	20,862
14 years	16,390
17 to 18 years	5,000 to 7,000

Though there is some doubt whether the numbers given by v. Hansemann are for one or both ovaries, yet they demonstrate clearly that there are many more ova present during the earliest years of life

than at puberty, and that even after puberty the numbers show a significant decrease. Marshall<sup>33</sup> states that not more than 400 ova reach maturity.

It is evident that a very large number of follicles, after attaining a certain amount of growth and development, undergo degeneration (atresia)—the ovum becomes shrivelled and eventually disappears; the follicular epithelium degenerates—a process shared by the theca interna; and the cavity remains for some time as an irregular cyst which eventually disappears. Stevens<sup>31</sup> has given an exhaustive account of the atretic follicle. Schochet<sup>32</sup> has shown that the liquor folliculi contains a proteolytic enzyme, and suggests that atresia is caused by the digestion, or alteration of the ovum by this enzyme.

#### THE INTERSTITIAL CELLS

Limon<sup>34</sup> has described accumulations of characteristic epithelioid cells, which are frequently observed in the neighborhood of the hilum in the fetus and in lower animals. These observations were confirmed by Aimé<sup>35</sup> and Bouin.<sup>36</sup> The origin of these interstitial cells is not clear, but as they are supposed to take part in the formation of internal secretion, they are designated as interstitial glands. L. Fraenkel<sup>37</sup> and A. Shaeffer<sup>38</sup> pointed out that the interstitial cells are absent in the adult ovary and are not constant in all species of lower animals.

Since the earliest work by Brown-Séquard<sup>39</sup> on the internal secretion of the testis, it has been generally conceded that the ovaries elaborate an internal secretion. Steinach<sup>40</sup> states that the internal secretion of the interstitial cells in the ovary has a specific influence in guiding the development of sexual characteristics. Some evidence for this view is found in the functional relationship that appears to exist between the ovary and other ductless glands. According to Hatai<sup>41</sup> removal of the ovary causes an enlargement of the thymus and affects the hypophysis and adrenals (decrease in weight). Shaffer<sup>42</sup> has shown that extracts of the ovaries contain two substances, one of which (interstitial cells) inhibits contractility of plain muscle, especially the muscle of the uterus, while the other augments this contractility.

The exact nature of the reciprocal relationships between the ductless glands cannot be explained at the present time. However, when one wishes to cloud or confuse the issue, or when one wishes to give an evasive answer, it is customary to refer to the ductless glands. Much further research is necessary before we shall be able safely to correlate the histologic structure with the hormonopoeitic function of the interstitial cells.

#### NERVES OF OVARY

The nerves are derived from the ovarian plexus and are distributed in the ovary as three trunks. The fibers are chiefly nonmedullated, communicate very freely with one another, and are furnished with microscopic ganglia and with groups of specialized cells (phoeochromic cells of Winiwarter).<sup>43</sup> Winterhalter<sup>44</sup> has described a sympathetic ganglion of the ovary, but von Herff<sup>45</sup> denies the existence of a ganglion with the exception of a few sympathetic cells in and about the blood vessels. This coincides with the opinion of other investigators, Mandl<sup>46</sup> and Vallet,<sup>47</sup> that the nonmedullated fibers for the most part are distributed along the blood vessels.



## OVULATION

Ovulation comprises the growth, development and rupture of the graafian follicle. From birth until the cessation of sexual life, graafian follicles are constantly being developed. During the growth and maturation of the ovum, cells of the graafian follicle, after increasing greatly in number, begin to liquefy. It is thought, that the different chemical composition of the liquor, thus forming in the follicle, induces an endosmosis by which the liquor folliculi increases faster than would seem possible solely as the result of liquefaction of follicular cells. The follicle distends so that, following the direction of least resistance, one side of it approaches the free surface of the ovary, producing a bulging on this surface, a dispersing of the ovarian stroma, and the thinning of its tunica albuginea and the epithelium. The final result is a compression of the blood capillaries lying between the follicle and the ovarian surface. It was supposed by Waldeyer,<sup>8, 17</sup> His<sup>22</sup> and von Baer that nourishment was cut off from a preformed nonvascular area in the follicle, and that rupture was the result of atrophy of the stroma. The ovum is thus extruded with its granular epithelium cover by the liquor folliculi. This granular material when set free, takes up water, and therefore, as is specially noticeable in the ovum of the rabbit, swells up into a clear gelatinous envelope, which has been termed the albumin.

Clark<sup>48</sup> has shown that the conception of a preformed, nonvascular area is incorrect. He further states that there is a deeper lying cause for follicle rupture than mere growth and its pushing forward toward the ovarian surface.

Schochet<sup>49</sup> proved that the liquor folliculi contains a specific proteolytic enzyme, and suggests that ovulation is a result of the digestive action of this enzyme.

Simultaneously with the enlargement of the follicle, the nucleus of the ovum undergoes a succession of remarkable synaptic changes (Win-iwarter,<sup>50</sup> Lane-Clayton).<sup>51</sup>

## MENSTRUATION AND OVULATION

There are many observations recorded in regard to the time ovulation takes place in mammals. For instance Sobotta,<sup>52</sup> for the mouse, and Rubaschkin,<sup>53</sup> for the guinea pig, ascertained that ovulation occurs during heat and is independent of coitus. Loeb<sup>54</sup> has confirmed this last observation for the guinea pig.

For man, two opposing hypotheses have coexisted for a number of years. Gendrin,<sup>55</sup> Pflüger<sup>7</sup> and Bischopp hold that menstruation is dependent upon ovulation, and coincident with it. The opposite view, of which Riegel is the chief exponent, maintains that ovulation and menstruation are two entirely independent functions.

Clinical experience has substantiated this latter view, since it has been shown that ovulation and subsequent pregnancies have taken place without menstruation, as is demonstrated by the instances of conception occurring before the establishment of menstruation or after menopause, as well as during lactation.<sup>56</sup>

According to Heape,<sup>57</sup> ovulation and menstruation are not associated, since in monkeys, menstruation may occur periodically all the year round, but the season for ovulation and conception is limited. This has been confirmed by von Herwerden<sup>58</sup> for monkeys and aberrant lemur.

Runge<sup>59</sup> states that enlarged follicles are by no means uncommon in ovaries of young children. Loeb<sup>54</sup> has observed relatively large follicles in the ovaries of eighteen-day-old guinea pigs. From these numerous observations it must be concluded that ovulation and menstruation are two independent functions; but that the latter is absolutely dependent upon the presence of the ovaries.

#### CORPUS LUTEUM

Those graafian follicles that attain maturity and burst, develop into corpora lutea. Bischoff stated that the corpus luteum owes its origin mainly to the granulosa stratum of the wall of the empty follicle, which as it increases in extent occupies more and more of the follicle cavity. On the other hand von Baer considered that the corpus luteum was wholly due to a hyperplasia of the polyhedral interstitial stroma cells (of connective tissue origin) and thus represents cells of the theca interna together with a development of blood vessels. This view has been confirmed by the more recent works of Beigel,<sup>60</sup> Clark,<sup>48</sup> Hegar<sup>61</sup> and many others. However, these observations are at variance with those of Sobotta,<sup>52</sup> Stratz, Cohn,<sup>62</sup> Van der Stricht,<sup>63</sup> and Marshall,<sup>64</sup> who maintain that the corpus luteum owes its origin to a simple hyperplasia of the epithelial cells of the membrana granulosa; while Loeb<sup>54</sup> believes that the lutein cells are partly of connective tissue origin and partly of epithelial origin as observed in the guinea pig.

The structural appearance of the corpus luteum with its large cleft like spaces (lymphatics of His)<sup>22</sup> is not unlike that met in the cortical part of the suprarenal glands. Exner and Buckel do not confirm the existence of lymph vessels in the corpora lutea. The peculiar yellow pigment or granules in the cells give the corpus luteum its characteristic color. In its center we find a blood clot undergoing organization. Why a physiologic process like ovulation and menstruation should be associated with hemorrhage, is not definitely understood. Ries<sup>65</sup> emphasizes that every essential function of the female reproductive organs is associated with hemorrhage. Occasionally the central clot is absent, and such is the rule in many lower animals, as, e.g., in the rabbit and mouse. Later, the corpora lutea are rapidly absorbed, so that in a short time the degenerated lutein cells are replaced by newly formed connective tissue cells. These resemble closely the surrounding ovarian stroma cells. Clark<sup>48</sup> has estimated that if the follicles were obliterated by scar tissue, the result would be a fibroma 5000 times as large as the original ovary.

Various functions have been ascribed to the corpus luteum. De Graaf described it as a conglomerated glandular body, and it was considered by all earlier authorities a positive evidence of existing pregnancy. It is said that Sir Astley Cooper<sup>3</sup> and Denmann asserted under oath that a certain woman was pregnant because a corpus luteum had been found in one of her ovaries. Others believed that the presence of a corpus luteum indicated that the individual had indulged in sexual relations, or had at least been subjected to marked sexual excitement. It was not until after the appearance of the work of Bischoff, Raciborski, Negrier and Bouchet<sup>3</sup> that these fallacious views were abandoned.

The functional value of the corpus luteum was not appreciated before the epoch making investigations of Fraenkel.<sup>66</sup> In a later contribution, Fraenkel<sup>67</sup> states that the corpus luteum is a gland that is

renewed every four weeks in woman during her reproductive life, and at varying intervals in animals. It controls the nutrition of the uterus in a cyclic fashion, prevents it from either relapsing into its infantile or passing into its senile state; and prepares the endometrium for the reception of the ovum. If the ovum be fertilized the corpus luteum continues to exist and to maintain the augmented nutrition of the uterus during pregnancy. If the ovum is not fertilized, the corpus luteum merely produces the hyperemia of menstruation and then degenerates. There is strictly speaking only one corpus luteum, which regenerates itself periodically in slightly different situations and controls the uterine life from puberty to menopause. Menstruation is caused by the secretory activity of the corpus luteum, not by the pressure of the growing follicles on the ovarian nerves. The secretory activity causes the four-weekly hyperemia which makes possible the implantation of the fertilized ovum or leads to menstruation. Anomalous uterine bleeding and some forms of sterility may be due to pathologic conditions of the corpus luteum. Amenorrhea and uterine atrophy may follow the same cause. Lactation atrophy is a good example. During lactation, as a rule, there is no ovulation, therefore, no fresh corpora lutea are formed. This theory was substantiated by observations on the rabbit and also on woman (95 operative cases). If the corpus luteum was destroyed by a cautery the next succeeding menstrual flow failed to occur. This theory is not hypothetical but rests on a secure foundation of experimental facts. Though most convincing, Frank<sup>68</sup> and Marshall have not accepted this view as entirely accurate. In the marsupials the corpus luteum is well developed, yet in these animals implantation of the ovum can hardly be said to occur; only apposition, and not implantation of the ovum is seen in the ingulates in which the corpus luteum is highly developed; and finally it has been demonstrated that in women the corpus luteum might be removed in the early weeks of pregnancy without any disturbance to the ovum.

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## Selected Abstracts

### Gonorrhea in the Female

**Norris and Mickelberg: Diagnosis of Gonorrhea in the Female by Staining Methods.** *Journal American Medical Association*, 1921, lxxvi, 164.

In the acute stage of gonorrhea, both in the adult and child, the diagnosis is usually easily made from the history and clinical symptoms; if doubtful, it can be established by a smear. In chronic cases, the diagnosis is often difficult. Smears, to be of value, must be very carefully examined to guard against errors. Gonococci not only are few in number and often atypical, but may be confused with other bacteria of similar morphology. Gram's stain, if carefully made, will usually clear up the doubt. Owing to frequent sources of error, the authors believe that, unless done by an expert, stained films are of no value and, even when made by the most experienced, too much weight should not be placed on the findings. *Diplococcus catarrhalis* is almost identical with the gonococcus, both morphologically and tinctorially.

Material should be taken from the cervix, urethra, Skene's or Bartholin's glands, preferably by means of a medicine dropper the end of which has been drawn out to the thickness of a coarse capillary tube. In very young children the vagina is washed with dilute bichloride solution by means of a soft rubber eye syringe. The child's hips are raised and the solution forced out and sucked in a number of times; the washings are then centrifuged at slow speed and the sediment examined.

In concluding the authors state that, in their opinion the usefulness of staining methods has been overestimated; that clinical evidence is of greater value, even when the films are prepared by an expert; that, under most favorable circumstances, positive smears can be obtained only in a small proportion of cases; and, that, from a practical standpoint, all cases should be regarded as gonorrheal unless proved otherwise.

R. E. WOBUS.

**Jacoby: Gonorrhea in Women.** Medical Record. 1921, xcix, 14.

Gonorrhea is responsible for more than 50% of all female pelvic inflammatory conditions. From a study of a series of cases—60% of infections were combined cervical and urethral, 30% cervical alone and 10% urethral alone. In a series of examinations of 300 cases, 100 were clinically diagnosed as gonorrhea. One smear examination of the 100 cases resulted in 8 positive and 12 doubtful microscopic reports. After taking an average of five smears from 50 of the cases of clinical gonorrhea 47 or 94% showed positive smears or about 32% positives among the entire 300 cases examined. Single smear report is not to be relied upon. Complications and end results of gonorrheal infections are discussed by the author and proper treatment is outlined. Extreme conservatism is advised in meeting complications. Whether the patient remains a source of infection depends largely upon the thoroughness with which the freedom from infection is determined, the author giving 5 conditions which should be carried out before discharging a case from observation and treatment.

C. O. MALAND.

**Rubin: Vaginal Discharge in Children. Diagnostic and Specific Value of Smear Examinations.** Boston Medical and Surgical Journal, 1918, clxxviii, 147.

The writer studied this problem on 255 selected cases in the Special Clinic for Vaginitis, maintained in the Mt. Sinai Hospital Dispensary, New York. In this paper two points receive special attention: (1) the incidence and prevalence of gonorrheal vaginitis in children, and (2) the value of smear examinations in the diagnosis of this disease.

The general consensus of medical opinion undeniably favors the gonococcus origin in the vast majority of cases of vulvo-vaginitis in children. Upon this assumption are based all rules for prevention, control and cure of the disease as applying to homes, hospitals and communities. Observations in this class of cases have led Rubin to a conclusion contrary to the one prevailing. Too much value is placed on the outcome of the smear examination for diagnosis. Cases with a positive first smear are reported negative for one or more times consecutively, then again to turn positive. The same inconsistency can be observed in regard to first negative smears. Results of smear examinations are out of all logical relation to the clinical status of the case, the character, amount or duration of the discharge, and especially to subsequent examination. Frequently without any treatment a second report was negative, a third positive, then changing erratically. Even after all discharge had disappeared after treatment no reliability could be placed on the outcome of the smear. This obviously proves a great drawback in the study of a useful therapy. Rubin started with the strong silver solutions, recommended by Kelly. The immediate result invariably was an increased discharge, often with positive, occasionally with negative smear reports. Changing to weaker silver solutions at least the amount of discharge lessened or disappeared. Again smear reports remained erratic and unreliable. From these weaker solutions Rubin turned to applications in longer intervals until finally, for purpose of control, he simply observed those cases without any treatment which at least clinically did not seem

gonorrheal. Also in the untreated cases smear reports remained confusing. But surely in this group the children seemed to do better at least as far as the discharge was concerned.

This evident contradiction between smear and symptomatology may be explained, first, by the fact that the gonococcus, if responsible for vaginitis in a child, is biologically different from that in the adult form of the infection, and, secondly, that the diplococcus seen in the smear is not a true gonococcus though not distinguishable from it in appearance and staining characteristics.

In favor of the first contention it must be emphasized that from the clinical side the very smallest number of children resemble closely the disease as met with in the adult. In the vast majority of them the common sequelae are missing, such as ophthalmia, urethritis, joint involvement, and most of all peritoneal symptoms and complications.

In regard to the microscopic resemblance to the true gonococcus it is known that vaginitis in children often is caused by micrococcus catarhalis (morphologically often indistinguishable in the smear from the gonococcus), by pneumococcus, meningococcus, streptococcus, and very often by the omnipresent bacterium coli.

That a true gonorrheal vaginitis does occur in children, however, cannot be denied. Its actual incidence probably is small. The definite diagnosis of such an infection cannot be based solely on smear examinations, but must be confirmed by bacteriologic cultural methods and serologic tests.

**Asch:** *Gonorrheal Infection of Small Girls.* Zeitschrift fuer Geburtshuelfe und Gynaekologie, 1919, lxxxii, 28.

Tubal occlusion, in the absence of a history of gonorrhea customarily regarded as congenital, might well represent the end effect of an infection acquired in early childhood. In some instances this infection of the genital tract might have been started by scarlatina or diphtheria, but most often it has been a gonorrheal infection. Also some of the vaginal adhesions and occlusions, formerly considered congenital, now are recognized as due to a gonorrheal infection of the young. Similarly might be explained the etiology of some obscure cases of cervical stenosis. Retraction and agglutination of the tubal fimbriae terminating in complete occlusion of the tube, in general are characteristic for gonorrhea, and hardly ever seen after other infections, e.g. after appendicitis.

Saenger was among the first to suggest that in young girls an otherwise unintelligible peritonitis, or peritoneal irritation, or suspected appendicitis in fact may be an ascending blenorrhoeic infection which later in life manifests itself in the form of sterility.

It will become an important problem of scientific investigation to inquire into the later life history of children suffering from gonorrheal vaginitis. A study by Block, made on a small number of treated and cured cases, only proves that some of them later in life become pregnant and bear children. But this still leaves unsolved the more important question of the ultimate fate of the vast number of untreated cases, and of the final outcome in instances of unexplained peritonitis during early childhood. Pediatricians however, will realize that in



children not too much weight can be placed on the symptom of abdominal pain, the most important symptom of a peritoneal irritation. In some of these cases the pain might be solely due to the complicating cystitis. The diagnosis of peritonitis due to ascending gonorrheal infection in the young child can be made definitely only by excluding the possibility of an appendicitis as cause for the peritoneal symptoms. It seems obvious that in the little child a gonorrheal infection only extremely rarely will succeed in passing the barrier of the external os and the cervical canal.

In the treatment it is well to remember that in the child the rectal mucosa often becomes infected. In speaking of the advantage of using the well instructed mother for treating the child, Asch emphasizes that eye complications are so rarely seen because the danger of the child's gonorrhea to her eyes is so well appreciated by the laity.

Recent attempts to combine local antiseptic treatment with general therapy (arthigon, vaccines, collargol, artificial fever, very hot continued baths, diathermy, etc.) as a whole have failed. Proper local treatment, chiefly with antiseptic vaginal suppositories, finally always results in cure. But even in cases of apparent clinical cure, with successive negative smears, the child must be kept under observation for a long time.

Asch in his conclusions states that ascension of the gonorrheal infection into the uterus is very rare before puberty. In the child local vaginal treatment does not favor ascension. Cured cases do not reveal permanent injuries later in life. Without treatment the infection apparently persists, and in chronic cases may lead to permanent damage such as complete tubal occlusion.

**Wachs and Mazer: Gonorrheal Vaginitis in Children.** New York Medical Journal, 1920, cxi, 1997.

During the earlier part of 1919 the writers gave a thorough trial to a silver paste prepared for Dr. John Cooke Hirst, which theoretically seemed an ideal treatment for gonorrheal vaginitis in that its slow solvency effected a constant contact with the vaginal mucosa for 24 hours. Though some patients improved temporarily, the final results did not warrant the further use of this preparation.

In April 1919, therefore, they began the use of Dakin's oil in a series of 58 chronic cases, some of them having resisted treatment up to four years. They employed a freshly prepared one per cent solution. The child lying in Trendelenburg position, the vagina is filled by means of a dropper, and then the labia held compressed for a few minutes. This treatment is given daily, alternately in the clinic and at home by the mother. Smears are taken every two weeks. Within a month improvement is marked. Twenty-five cases appeared to be cured at the end of the third month. At the end of the fourth month 39 children had been discharged, leaving 6 patients still showing pus-cells and many bacteria. The oil in this concentration is well borne in chronic cases, but proves too irritating in the acute stage. Recurrences were seen in from one to four months after apparent cure, therefore, it is necessary to keep all children under prolonged observation.

**Northrup: Two Cases of Gonococcal Peritonitis in Young Girls.**  
Archives of Pediatrics, 1918, xxxvi, 475.

The original histories of these two cases had been reported by the writer in 1903. Now, 16 years later, he places the fact on record that both girls had married and one of them borne a child. In regard to this case it proves interesting to recall the following features of the original report: The infection had been acquired from an adult in the family. Onset was exceedingly abrupt, abdominal pain at once very intense. Localized pain and sensitiveness in the right iliac fossa, moderate abdominal distension, ghastly pallor, temperature 104½ F. Six hours later a laparotomy was performed, revealing an intense injection of the entire peritoneum, the cecum being blood red. Appendix was removed; ovaries and tubes showing the same red color were not touched. Prompt recovery.

**Bucura: Gonorrhea in Women.** Wiener klinische Wochenschrift 1920, xxxiii, 789.

A long article covering the course and treatment of gonorrhea. The gonococcus grows best at the temperature of the human body. It is not resistant to heat as it dies in cultures kept at 36° to 37° C in 13 to 14 hours and at 40° C in 7 hours. It is resistant to lower temperatures as it can be regained from the heart blood 24 hours after death. This is significant in using hot douches and baths in treatment though perhaps the hyperemia is the effective agent.

The gonococcus manufactures a toxin which causes an inflammation resulting in a serous, hemorrhagic, purulent, or mucopurulent exudate. The germ penetrates undamaged epithelium between the cells, eventually reaching the subepithelial connective tissue, leading to endarteritis, thrombosis and metastasis. This fact explains the slight benefit from a direct application of drugs.

The gonococcus attacks most easily cylindrical epithelium, less easily pavement epithelium. The urethra, ducts of the vulval and urethral glands, cervical canal, uterine cavity, and tubes are specially prone to become infected; the vulva and vagina only at the periods when their epithelium is soft and succulent, i.e. before puberty, during pregnancy, and in old age.

Some individuals and families seem to have an immunity against infection and extension of the process.

The duration of the disease is not known. Persistence for ten years and more might be due to reinfections. It is known that the germ dies quickly in closed cavities such as a pyosalpinx. The author has seen the ascension of the infection to the tubes with simultaneous healing in the cervix and uterus which he thinks may be due to the development of an antitoxin.

The diagnosis is simple when the germ is seen. The chronic cases require a painstaking examination of the discharge from urethra, vulval glands, and crypts, vagina, cervix, and uterine cavity, repeated many times. The author insists upon the necessity of finding the gonococcus for the positive diagnosis because the disease has no typical clinical symptoms and may be confused with any gynecologic disease causing discharge.

The gonococcal etiology of adnexal disease is established only by discovering the germ. The wrong diagnosis is made too often. If prostitutes are left out of consideration, less than 50% of adnexal inflammations are due to the gonococcus.

The treatment consists of rest and abstention from coitus, the use of vaccines, and local applications. Vaccines are used in all cases because they seem to lessen extension of the trouble to the uterus and tubes. A polyvalent vaccine is used at intervals of 3 to 8 days beginning with 5 million, then 25, 50, and 100; then 100 repeated to a total in all of 10 to 12 doses.

There is no specific drug for local application. Silver nitrate, corrosive sublimate, and carbolic acid coagulate the exudate and prevent further penetration of the agent. Protargol, collargol, argentamin, and methylene blue in 1 per cent or stronger solution are the best. The urethritis rarely needs treatment, it gets well if let alone. The treatment of the urethral and vulval glands and crypts is most difficult and may require excision. The vagina is seldom infected. Tampons have no place in the treatment, but douches at least wash out the discharge. In treating the cervix the exudate is removed and the drug applied to a clean surface.

Infection of the uterine cavity frequently causes tubal infection. The latter will not heal until the uterine infection is cured. The uterine cavity is treated by the injection of a few drops of any of the above drugs through a ureteral catheter introduced with the strictest regard for asepsis.

Acute infection of the tubes is treated symptomatically. When the acute symptoms subside vaccines and local treatment are given. The latter consists of douches, tampons, hot air, and later on intrauterine treatment. Operation should not be done in the subacute stage because of the danger of peritonitis, of infection of the wound, and phlebitis. Operation in the chronic stage is determined by the symptoms and such social indications as marriage or sterility.

Definite cure is established as follows: During treatment discharge from the several sites of infection is examined once or twice a month; when clinical symptoms have become stationary or have disappeared for several weeks after the last finding of the gonococcus treatment is stopped; then the patient is seen once or twice a month for three months. She leads a normal life and is allowed coitus with a condom. Postmenstrually secretions from the various sites are examined, if no gonococci are found during these three months Bucura considers the patient as cured.

FRANK A. PEMBERTON.

**Stevens and Heppner: Gonorrhea of the Lower Genito-Urinary Tract in Women, with Special Reference to the Glands of Bartholin.**  
Journal American Medical Association, 1920, lxxv, 1477.

This study is based on 3,439 examinations of prostitutes detained at the San Francisco County Hospital. Chronic gonorrheal infection was determined in 43.5 per cent. At first the diagnosis was based on clinical findings plus either the detection of the organisms in smears or a ++ or +++ positive complement-fixation test, the fallibility of both of these methods being conceded. Later, the diagnosis was based on clinical findings alone, yet in 95 per cent of cases so diagnosed, Gram-



negative organisms were demonstrated at some time during their stay in hospital. In 47 per cent the infection was in the cervix, in 32 per cent, in the urethra, and in 23 per cent in the glands of Bartholin.

Cervical smears were obtained by cleansing the canal and then compressing the cervix between the blades of a bivalve speculum. In the examination of the urethra, the two glass test as well as urethroscope and skenoscope were employed. The filiform bougie was used to locate and explore the urethral as well as Bartholin's glands. Strictures of the urethra, which, the authors state, are relatively common in women, were determined by bulbous bougies.

The following treatment is advocated: Cervical infections are treated by cauterizing with 25 per cent silver nitrate solution twice weekly for one or two weeks, supplemented at times by prolonged hot douches. Acute urethritis is treated by rest, diet, oil of sandalwood and alkaline diuretics; if it becomes chronic, instillations of 1 to 3 per cent silver nitrate, or local applications of stronger solutions through the endoscope, are advocated. Infected urethral glands are destroyed by actual cautery or fulguration. Strictures are dilated or incised. All palpable Bartholinian glands are removed. The injection of glands was found to be of little value.

The authors feel that gonorrhea occurs more frequently in women than is generally appreciated, and should be accorded more attention than heretofore.

R. E. WOBUS.

**Froriep: Treatment of Infectious Diseases of the Vagina with Tincture of Iodin.** Muenchener medizinische Wochenschrift, 1920, lxvii, 1202.

Iodin applied to the mucous membranes of the vagina has proved very efficacious in the treatment of the various types of vaginitis, especially when gonorrheal in origin. A single application is made the first time, which results on the second day, in a moderate swelling of the mucous membranes; this disappears about the third day. The dark necrotic membrane sloughs off. In a few cases considerable burning pain is experienced which rarely persists over two hours. If the purulent discharge persists after the first application, it is repeated one or more times. In urethritis it is employed merely to prevent extension of the infection into the bladder and so is useless where cystitis has already developed: its use here demands subsequent catheterization.

S. B. SOLHAUG.

**Foss: Treatment of Gonorrhea in Women.** British Medical Journal, March 27, 1920. No. 3091, p. 434.

The comparative failure of most reagents in the treatment of gonorrhea in the female is due to the inaccessibility of the gonococcus in the various glands. It seems rational to suppose that a greatly increased secretion from these glands will produce a flushing out of the gonococci. This increased glandular secretion the writer claims to achieve with glycerin, which he mixes in the proportion of 1 to 4 with water, adding 1 gram of methylene blue to 100 c.c. of the solution. After cleansing of the vagina, gauze soaked in this solution, is packed against the cervix. He uses simultaneously gonococcal vaccines giving a total of six injections, weekly, commencing with 5 million bacteria, increasing up to 150 millions.

**Block: The Treatment of Acute Gonorrhea in the Female.** American Journal of the Medical Sciences, 1920, clix, 572.

The main object of this paper is to encourage more extensive instruction in medical schools in the treatment of acute gonorrhea in the female, so that the practitioner may be less skeptical and undertake the treatment of these cases with a cheerful optimism as to the outcome, even though he may not be successful in all cases. Methods of treatment that have proved most satisfactory in the writer's personal experience are given as follows:

*Acute Urethritis.*—Santal oil, 10 minims, three times daily; urinary sedative containing 5 minims of tincture of hyoseyamus and 10 grains of sodium bromide to one dram of liquor of potassium citrate, taken every three hours. Local treatment to begin only two to three weeks later. A 15 per cent solution of silver nucleinate or a 5 per cent solution of silver nitrate are applied along entire urethra with a cotton swab on an applicator.

*Acute Endocervicitis.*—Hot douches of a 1 to 8000 solution of potassium permanganate four to five times daily. Cervical canal is cleansed with liquor antisepticus alkalinus up to internal os, then vigorously painted with a 10 to 12.5 per cent solution of silver nitrate, immediately followed by tincture of iodine. Only in exceptional cases use is made of vaginal tampon. This treatment is repeated twice or three times a week, the patient in the meantime using douches.

**Saenger: Acute Gonorrhea in the Female.** Monatsschrift fuer Geburtshilfe und Gynaekologie, 1920, liii, 197.

The one main endeavor in the treatment must be to prevent the infection from traveling up into the cervix. Therefore, local treatment is best limited to antiseptic applications to urethra and paraurethral ducts, and all vaginal douching is prohibited. The patient is kept as quiet as possible, and ordered to bed at least during the time of menstruation.

**Ivens: A Note on the Use of Antigonococcal Serum.** British Medical Journal, 1921, No. 3133, 77.

The author reports on the use of the serum in about 32 cases. In 22 of these tubal infection was a marked feature. Endocervicitis was present in 3. There were also 3 cases of arthritis. The method of administration was by subcutaneous injection in 19, intratubal and peritoneal injection in 6, use of vaginal pack in 3, and serum dressings in 2 cases of Bartholinitis. The method of subcutaneous administration was to give 20 c.c. of the serum diluted in normal saline. It was repeated at intervals of a couple of days to a week, giving in all from 20 to 200 c.c. In the surgical cases, conservative procedures were adopted. Twenty c.c. of the serum were injected into the tubes and a residue was left in the pouch of Douglas. In a few cases of endocervicitis he used packs with as much as 200 cubic centimeters of serum. He has not tried the intravenous administration of the serum. Only cases definitely gonorrheal in origin are included. They all made a good immediate recovery. There were three ultimate failures, one acute case where he had employed an insufficient amount of serum,

and two relapses after a period of some months which may have been due to re-infection. The subjective symptoms seem to be relieved by subcutaneous injection.

The author reports 6 cases in detail. He does not wish to be understood as drawing any definite conclusions from such a small series of cases. He used both indirect and direct methods of administration. The latter was favored because the toxin is not diffusible and the gonococcus similar to the meningococcus has an endotoxin. Results should, therefore, be more favorable by bringing the serum directly in contact with the organism. The serum was prepared by Professor Nicolle of the Pasteur Institute.

F. L. ADAIR.

**Kapferer: The Treatment of Gonorrhea with Hot Baths.** Wiener klinische Wochenschrift, 1920, xxxiii, 107.

The author treated 10 cases of acute gonorrhea, some having salpingitis, by means of hot baths after the method devised by Weiss. This method is based on two assumptions: that the gonococcus dies at a temperature of 40° C and that the body temperature can be raised to and above that degree by means of a protracted hot bath. The bath is started at 38° C. and the temperature raised gradually in 15 minutes to 43° C., in some cases as high as 46° C. The patient is kept in the bath as long as possible, the longest in this series being one hour and fifty minutes. The highest body temperature, taken by mouth, was found 42.8° C.; but in most patients it was not higher than 41.5° C. The baths are given on successive days, the largest number given to one patient being 10, most patients getting only 5 to 8.

The treatment is very severe, many patients having a pulse rate up to 160, at which point the bath has to be stopped; many patients vomit; they are restless; the blood pressure rises 10 to 20 points; and even collapse occasionally occurs, one patient being comatose for several hours with a blood pressure of 50. The customary local treatments were carried on during the period that the baths were used.

Four cases did not complete the treatment. Three cases showed gonococci in the cervix at the completion of treatment. Three cases showed cessation of discharge and no gonococci at the end of treatment, one of them being examined only once.

The author concludes that (1) The body temperature can be raised by hot baths; (2) The treatment is very severe and can be employed only in robust patients; (3) A definite result cannot be expected.

FRANK A. PEMBERTON.

**Romeick: Treatment of Gonorrhea in the Female with Intravenous Injections of Collargol.** Zentralblatt für Gynaekologie, 1920, xlv, 611.

Prompted by the good results reported by Manzi with this therapy the writer studied its effect on 20 cases of uncomplicated gonorrhea of urethra, cervix and Bartholinie glands.

A two per cent solution of collargol was injected, in intervals of from 3 to 5 days. Beginning with a dosis of 2 c.c., he gradually increased it to a maximum of 11 c.c. About 3 to 4 hours after the injection a severe reaction occurs with chills, elevation of temperature, pain in head and back, and general malaise. These symptoms disap-



pear in the course of 4 to 5 hours. Two patients developed an albuminuria, in a third the headache became so intense that treatment had to be stopped.

Only 17 patients were finally considered cured, but they also had received local applications of silver solutions and of heat. Three patients remained uncured after receiving injections for from 7 to 11 weeks. The cured patients averaged 6 injections within 40 days. The writer concludes that this combination of the customary local treatment with intravenous injections of collargol seems to shorten the usual time required for cure, but that the method cannot be regarded as free of all danger.

**Brauns: The Question of Treatment of Gonorrhea in the Female.**  
*Zentralblatt für Gynaekologie*, 1920, xliv, 16.

With the enormous increase of gonorrhea among men, as one of the effects of the war, renewed and increased interest is shown in the question of the successful treatment of the infection in the female. Many new forms of therapy have been suggested, many of the older ones have been modified. With skepticism one has to look on the "results" recorded after mere experimentation with such methods as injection of turpentine, collargol or milk, with diathermy, vaccine therapy, or the effect of light rays (Gauss). How essential it is to scrutinize more critically new suggestions is well exemplified in the method advocated by Manzi, consisting in a combination of antiseptic local applications with intravenous injections of collargol. The results, recently recorded by Albrecht with the Manzi treatment, in the main only prove how persistent physicians, and how tolerant patients can be. When is a gonorrhea to be considered as cured? Surely not when "all clinical symptoms" have disappeared. Of practical value is only the positive gonococcus smear, never the negative one. It is a known fact that gonococci may remain for a long time in a latent state in folds of the mucosa or especially in the paraurethral ducts.

For years it has been the rule in Menge's clinic in Heidelberg in cases of urogenital blenorrhea to restrict all treatment to the urethral gonorrhea and to leave the uterine infection severely alone. This form of therapy, as a whole, probably proved as good or as bad as any other treatment used anywhere else.

Of late the author experimented in Menge's clinic with a new type of antiseptic suppositories, characterized by the fact that they are "foam producing." Various preparations of this sort are now on the market. By the addition of tartaric acid and bicarbonate of soda this suppository causes a fine foam to form. The particular antiseptic substance contained in the suppository presumably is distributed over and actually driven into the mucosa by the bursting of these small bubbles containing carbon dioxid. The process continues for some time and thus is supposed to act like an antiseptic douche kept up for a long period.

Brauns acknowledges that theoretically these "foam producing" suppositories would seem useful, but that so far experimentation with them does not warrant the assertion that they prove more useful than the accepted treatment of Menge's clinic, limited to urethral applications combined with vaginal antiseptic douches.

**Prochownik: Gonorrheal Latency and Latent Gonorrhea.** Monats-schrift für Geburtshilfe und Gynaekologie, 1919, 1, 302.

The fact is not properly appreciated that gonococci might be present and propagate in the mucosa for a comparatively long time before their presence is manifested by clinical symptoms. During this, occasionally long, period of latency the patient obviously proves infectious. This holds true also for the latency of infection continuing after all subjective and objective symptoms have disappeared, when finally the patient might recover spontaneously. However, more often this latter type of gonorrheal latency finally leads to a latent gonorrhea. Only much later its existence is revealed by new symptoms, usually the result of overwork or of renewed sexual activity but without a new infection.

It will be of great practical importance to advance our information concerning the problem of gonorrheal latency.

**Wildenscov: Gonococcus Peritonitis.** Ugeskrift for Laeger, 1920, lxxxii, 1227. Abstract Journal American Medical Association, 1920, lxxv, 1758.

He describes the eleventh case of gonorrheal peritonitis in women observed in a Danish hospital and emphasizes the arrest of menstruation as an early symptom. Tenderness in both iliac fossæ, early meteorism with a lack of stiffening of the abdominal walls are important in the diagnosis of the toxic form. The prognosis is favorable in this particular form, but even in the infectious type is better than in any other form of peritonitis. In the 36 operated cases thus far recorded the mortality was only 16.6 per cent. He advises an expectant treatment, to be followed by operation if conditions grow worse.

**Salcedo: Gonococcus Peritonitis.** Revista Medica de Chile, 1919, xlvii, 59. Abstract Journal American Medical Association, 1919, lxiii, 459.

The onset of gonococcus peritonitis does not differ from that of any diffuse peritonitis, though as a whole the general condition of the patient remains more favorable. There is less vomiting or tympanism, the tongue is moist, the septicemia seems mild. Nevertheless he advocates immediate operation. Laparotomy reveals as primary focus the tubes or ovaries or both. In one of his operated cases, ending fatally, there existed a mixed infection of gonococcus with streptococcus, the toxemia being intense.

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## Original Communications

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### BORDER-LINE CARCINOMA OF THE CERVIX AND ITS TREATMENT\*

BY EDWARD A. WEISS, M.D., F.A.C.S., PITTSBURGH, PA.

IN view of the many different views that have been expressed regarding the palliative or nonsurgical treatment of cancer of the cervix, the question must still be considered an unsettled one and no definite conclusions can be formulated until a large number of cases are tabulated from different clinics. A study of reports in recent literature shows that there is a decided inclination to abandon operative procedures in favor of radium therapy, and the immediate results, generally obtained by this agent, are so favorable in contrast with some of the severe operative results, that the change seems almost justifiable. It should be remembered, however, that radium has not been used long enough by the large numbers of gynecologists to formulate a definite working technic, and too short a time has elapsed to speak of end-results in a large series of cases. Furthermore, the technic employed, the dosage of radium used, screening and other factors have not been standardized sufficiently to justify universal adoption. On the other hand the operative results, immediate and remote, have been carefully studied and followed up for twenty years, so that quite definite conclusions can be drawn regarding the comparative value of the different operative procedures; in other words, the operative treatment has been fairly standardized through the technic established by Wertheim, Ries, Werder and others. We feel that the study of the radium treatment, at this time, must be purely clinical and based

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."



on comparative results by those in a position to judge and to follow up the cases, mainly by the gynecologists rather than the physicist. A thorough co-operation of the two, however, is essential as there are many interesting chemo-biological questions to be analyzed.

For practical purposes we have endeavored to establish a clinical working classification of cancer of the cervix by dividing them into five groups. (1) Very early and favorable cases, definitely localized to the vaginal portion of the cervix. (2) Early cancer of the cervical canal with no palpable extension to the parametrium. (3) Border-line cases, that is, cancer with a moderate amount of tissue friability and fixation of adjacent structures, which fixation may be malignant or inflammatory in character. (4) Advanced cases, with unquestioned extension and metastasis, and clearly inoperable, but suitable for palliative treatment. (5) Far advanced and hopeless cases, and not suitable for any form of treatment.

We still believe that Groups 1 and 2 are distinctly surgical and should be treated along very radical lines following the technic outlined in the paper presented by the writer at the meeting of this Association in 1918 entitled "Radical Treatment of Cancer of the Cervix by igni-extirpation (Werder Operation)." The immediate and late results of this procedure have been so satisfactory during the past ten years that the operation is sometimes undertaken, even in the more advanced cases of Group 3, especially if the patient is considered a good operative risk; this factor is a most important one in deciding on any type of operative procedure. It is the neglect of this precaution that sometimes causes a high mortality or severe morbidity and, consequently, discredits the surgeon's judgment.

Not infrequently it is a difficult matter to say when carcinoma uteri is really of the border-line type, for one surgeon may consider a case unfavorable which another may classify as fairly early or as a border-line case, and, therefore, too much emphasis cannot be placed on the importance of a careful study of the type of cancer at hand before treatment is instituted. Clinical experience has shown that the squamous-cell cauliflower type of carcinoma presents a far more favorable surgical aspect than the adenocarcinoma, so that when any attempt at classification is made or when a prognosis is given, this histologic difference must be kept in mind. The same may be said of the age of the patient, for it is well known that the prognosis in a young woman with cancer is always more doubtful than in one advanced in years; a third and still more definite factor is the immunity, or resistance, that some patients develop against further invasion of the cancer. Hence, with these uncertain factors to deal with in our classification, definite statements as to the operability and prognosis cannot be made. Adenocarcinoma of the cervical canal has given such unfavorable results in surgical treatment that we have of late classified this form as

border-line cases even when seen in the early stage of the disease. The assertion by some surgeons, that this type of cancer is invariably fatal is, practically, borne out in our experience, and an unfavorable prognosis is generally to be expected when treated by purely operative measures.

When a diagnosis of cancer of the cervix has been made, appropriate treatment should be given at the earliest possible moment, nevertheless haste in operating is not always advisable. We have found from practical experience that preliminary preoperative rest in bed for several days results in a marked diminution in the size of the diseased cervix; but what is of more importance still is, that there is often noticed a decidedly less thickening and fixation of the broad ligaments, proving that the fixation was an inflammatory rather than a malignant invasion of the lymphatics of the broad ligaments. As a result of this observation we have frequently found that the supposedly inoperable case is really an operable one, or border-line case. During the period of rest in bed, a more careful study of the patient's resistance can be made and, should radical treatment follow, the condition of the patient is greatly improved and becomes a better operative risk. When it is well established that there is only a questionable malignant involvement of the parametrium, bladder, or rectum, our problem is not an easy one. Before the advent of radium, the general opinion was to perform radical extirpation when there was any doubt as to operability. The result was a high operative mortality and a severe morbidity even in competent hands, so that some surgeons went to the other extreme and palliative treatment only was performed when operability was doubtful.

In the border-line cases, the improved Byrne cautery technic, which is practically the first stage of the Werder radical igni-extirpation, has given us the best results for many years; and while only a few so-called permanent, or five year cures, were obtained, yet we have had several instances of complete freedom from symptoms for periods of from three to five years. In thirty-eight border-line cases so treated, there was recurrence with death in one case, in six months; two, in nine months; five, in twelve months; five, in eighteen months; eight, in two years; five, in two and one-half years; two, in three years; three, in three and one-half years; two, in four years; one, in five years; and four cases could not be traced after the first year. In this series one death resulted on the fourth day from embolism. Vesico-vaginal fistula occurred in one case, and rectovaginal fistula in one other, but were subsequently cured. Cystitis followed operation in three cases, and superficial burns on the vulva in six instances; the convalescence in these cases being protracted and annoying. In 21 cases, or over 50 per cent, the recurrence of the disease manifested itself, not at the site of the operation in the vaginal vault, but in the

parametrium, in deep pelvic glands, or remote organs, proving that the cautery was valuable in curing the local disease. A general résumé of this series of our operative border-line cases, while showing a fairly satisfactory result for so serious a condition, also reveals the fact that recurrence takes place sometimes quite early, and that convalescence is slow, so that we are justified in adopting other forms of treatment in these definitely doubtful cases.

It is a well-known fact that, among the laity, the operations for cancer of the uterus are considered the most serious of all operations, and that this belief has a deterring effect and keeps them from seeking treatment early. Surgeons of limited experience appreciate their inability to cope with the disease properly, with the result that timely operation and treatment are delayed or improperly performed. Clark has stated the proposition most clearly when he says: "If an operation or other therapeutic procedure is to have a permanent place in our armamentarium it must be sufficiently easy to make it available, not only for a few skilled specialists, but for the great body of surgeons. In these days of low mortality percentages attending nearly all the major operations, no operation can possibly gain headway which combines with it a shockingly high mortality and a large number of distressing sequelæ. It is possible that when we make a final summing of our combined experience we may have to accept the conclusion that a less radical operation even though it save fewer lives, may be preferable when attended by a low surgical mortality and few or no operative sequelæ."

Since the introduction of radium treatment of cancer by Hickham, 1906, the attitude of the profession has gradually changed from one of skepticism to that of confidence; and while the subject is still unsettled in many respects yet, through the careful studies of Kroenig, Bumm, Latzke, Schindler, and Legnen, previous to 1915, the way was paved for more exact study of the treatment. Since 1916 the carefully compiled statistics of Bergonie, Ransohoff, Schmitz, Bailey, Clark, and Janeway, confirm the early optimistic reports of radium therapy, at the same time pointing out the danger of indiscriminate and unscientific use of the remedy.

The results obtained by us with radium in a collection of advanced or inoperable cases were so striking, that in a series of forty-five border-line, or Group 4 cases, radium instead of the cautery was used; and, while the results were disappointing in some instances, we are forced to admit, after taking all factors into consideration that, in a small series of cases, radium has proved to be a most valuable adjunct, both as to immediate and remote results. To say that radium used in the cervix is a harmless procedure, is not in accordance with facts and its indiscriminate use will bring discredit on a very valuable adjunct in our gynecologic therapy. A glance at recent literature on the sub-



ject shows that almost every radiologist has evolved a technic of his own, some using one massive dose, others small amounts once, or repeated, and others a combination or variation of both methods. It is generally admitted that small dosage is safer even if less effective, a state of affairs practically analogous to palliative and radical operation. Follow-up and end-result reports from various centers show that overdosage frequently results in dangerous sequelæ such as absorption, ptomainemia, necrosis, fistula, infection and obstructive cicatrices. Our observations lead us to believe that small doses, 50 to 100 mg., used twenty-four to forty-eight hours, have given less dangerous sequelæ than massive dosage.

The technic employed in this series of strictly border-line cases has varied somewhat. The majority of those using radium in the cervix object to preliminary operative treatment of any kind. Bailey, in reporting his cases, states that he believes that the use of the cautery is not efficacious for the cure of cancer and the use of radium, following the operation, is not advisable for the tendency to fistula formation in the tissue, that has been partly desiccated, is very great, and hence the Percy operation as a preliminary to radium treatment has been discontinued by him. This unfortunate complication, no doubt, has frequently occurred after extensive cauterization. In 15 of our 45 border-line cases treated by radium, we have performed not the Percy but the high cautery amputation of the cervix followed by radium, using 1200 to 2400 mg. hr., and in none of these cases was there fistula formation or other untoward results. The other thirty cases were treated by radium alone and, although the cases are too recent to form definite conclusions, yet we believe that especially in the cauliflower type, the most favorable results are obtained by a combination of high cautery amputation and radium.

In using the cautery in the treatment of border-line cancer, a clear distinction must be made between the so-called Percy cauterization and high amputation by the cautery. In the former the cervix is not removed but a deep charring results which is often followed by fistula formation and severe constitutional reaction. The subsequent use of radium would not only be of little value, but would increase the tendency to fistula. The amputation of the cervix with the cautery, however, is rarely attended by such complications and when they occur it is the result of an operation improperly performed. Furthermore, the amputation removes the diseased area without severe cicatricial formation, so that radium can be applied later in an almost healthy area. The radium treatment then is practically used as in an early stage of the disease and a relatively small amount of radium may be employed. It is sometimes remarkable how rapidly the fungating friable cancer tissue disappears when radium is used in the cervical canal and in the vaginal fornices. The result, however, is a marked contraction and

dense fibrosis; the vaginal cervix being replaced by a heavy, unyielding scar. The cautery, on the other hand, removed the cervix, leaving a clean granulating area after several days. It may be asked: Why use radium when the cautery removes the diseased tissue? The difference is that, in the light of our present experience, heat destroys the cancer cells only to a limited distance from the cautery; whereas, the radium exerts its influence to a much greater degree throughout the pelvis, and thus arrests or destroys the outlying cancer cells.

Schmitz has recently pointed out that, in properly selected cases, a radium capsule placed in the canal of the cervix will distribute rays evenly through the pelvic cavity and that the rays, properly screened, must penetrate six centimeters of tissue all around with such intensity at the periphery that carcinoma cells at this distance become destroyed. While it is necessary to so place the radium within the cervical canal as to reach the periphery of the cancer tissue, it must be borne in mind that the bladder, rectum, and ureter, are subject to radium injury. It is still an unsettled question how resistant normal tissue is to radium, but it is conceded that cancer tissue is about one and a half times more sensitive to radium than healthy tissue. Nevertheless, it is a precaution, as Schmitz pointed out, to have the bowels, and the bladder kept empty during the time radium is in the cervix. A full rectum or distended bladder would push the walls of those organs one to one and a half centimeters closer to the radium and subject the walls to unnecessary and perhaps dangerous radiation.

The question is frequently asked, should radical operation be performed after the border-line cancer has been arrested by radium. The practice of some surgeons has been to operate when all evidence of local necrosis and fixation have disappeared, but the results reported are not generally satisfactory. Our limited experience does not justify making a definite statement, but many are of the opinion that, if a clinical cure is obtained, no great advantage is to be had by subjecting the patient to a subsequent severe and questionable operation. Some observers state that, if recurrence develops after radium, it will manifest itself within the first year. Bumm, however, has found several recurrences after two and three years. One illustrative case of our own may be cited. A patient, age 36, with cancer of the anterior lip of the cervix had an apparent involvement of the bladder wall. The application of fifty mg. radium for forty-eight hours, resulted in an apparent cure. Examination every two months showed no recurrence. After twenty months there was evidence of a small hard nodule not unlike a very small fibroid in the anterior vaginal wall. This was excised for examination and proved to be a degenerated carcinoma with much broken-down tissue. Within three weeks there was a rapid recurrence and it could not be arrested by successive doses of radium. It is our belief that such recurrence should not be operated, as trauma

seems to excite the dormant cancer cells. In clearly operative cases, however, where radium is used as a preoperative precaution, we believe panhysterectomy should be done within ten to twenty days. It has been our observation that small, rather than massive, doses should be employed when used as a preoperative procedure, as large doses produce dense scar tissue and render radical operation difficult. A safe rule is to employ 2400 milligram hours radium element which does not, as a rule, produce heavy scar tissue.

#### CONCLUSIONS

Cancer of the cervix is still to be classed as an operative condition when discovered early and the patient is a good risk. When a doubtful border-line condition is presented, treatment by radium is advisable and the question of subsequent operation should be determined by the reaction obtained; but if operation is contraindicated by age, general condition, heart, kidney, or blood vessels, radium alone should be used.

A careful comparison between the cautery and radium type of treatment shows that both have advantages and disadvantages and that, in carefully selected border-line cases, far better results are obtained by a judicious combination of cautery amputation followed by moderate doses of radium.

Our results in this small series of border-line cases, while generally satisfactory, are far from conclusive. We have presented our changing views on the subject with the hope that other members of the society will tabulate their results, in order that the less experienced surgeons may formulate some definite plan of procedure in dealing with a diseased condition which heretofore has presented much difficulty. The wide range of radium dosage in treating cervical cancer, varying from 1500 mg. hours in some clinics to 8000 mg. hours in others, shows that no definite conclusions have been reached; and while favorable reports have been received from both extremes, the use of radium will be somewhat empirical. Definite conclusions can be drawn only after a careful tabulation of a long series of cases based on follow-up and end-results.



## SOME FACTORS THAT DETERMINE TISSUE RESISTANCE TO CANCER\*

BY JAMES E. DAVIS, M.D., DETROIT, MICH.

**C**OMPLEXITY of organization imposes biologic deprecatory limitations of resistance upon individual cells for purposes of aggregate efficiency. The highest plants easily reproduce all their organs, leaves and branches, as well as roots; but the vertebrate is incapable of reproducing a single complete organ. This is a provision that gives the plant a form of resistance possessing certain advantages in neoplasia. The vertebrate, however, is better organized against mass invasion though at a disadvantage in combating tissue new growths.

The life of a complex organism is the result of cell interactions and the internal metabolism of the individual cells. Factors altering cell interactions are tolerated by the higher vertebrate forms only when it is possible to accomplish conformation within a limited period of time. Convincing examples of this fact are observed after amputations, resections, traumatizations, auto- and homeotransplants and heteroplastic grafts. Loeb<sup>1</sup> transplanted thyroid into subcutaneous tissue, removed it seven days later and found the transplant surrounded by a connective tissue capsule rich in fibroblasts. Inside the capsule a large vessel was proliferating. In the capsule and about the vessel a few thyroid acini in contracted form were persisting. Necrosis, hemorrhage and organization were going on elsewhere conforming the transplant.

The transplantation of tumors in the higher species of animals has failed, except that of infectious sarcoma in the dog. In normal tissues, resistance is adequate for control and destruction of inherent neoplastic dynamic growth power. This power is uncontrollable in autogenetically prepared tissue lying close to the neoplasm.

The cell and its surrounding fluid possess inter- and retroactive properties. The most convincing proof of this is given by Carrel,<sup>2</sup> who has grown connective tissue in vitro for almost eight years. The plasmatic jelly medium, when used too long, became liquefied, its fibrin disappeared and all the air rarefied, effecting a marked slowing of growth. Fresh, unused plasma from the ice box promptly quickened the growth rate. The plasma from a chicken four to five months old caused a growth fifteen microns more extensive than did that from a five to six year old.

The reactions following exhaustion, irritation and specific diet, give acidity, toxicity, and cytoplasmic sensitization. Measurement of these states is a procedure of real scientific value to the clinician.

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

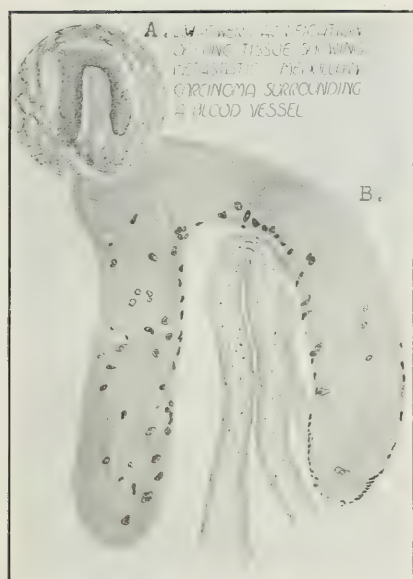


Fig. 1.—Illustrative of cell anaplasia and tumor metastasis.

B. Diagrammatic representation of same cancer area showing: Long narrow nuclei and round cell infiltration of blood vessel. Variation in size and shape of cancer cells and their nuclei. Some cancer cells have long diameters perpendicular to vessel as if attacking it. Nuclear material abundant in some and scarce in others, areas of fatty infiltration, etc.

Figs. 1-6 all show significant factors of high tissue resistance.

Figs. 7, 8, 9, illustrate severe malignancy and low resistance of normal structures.

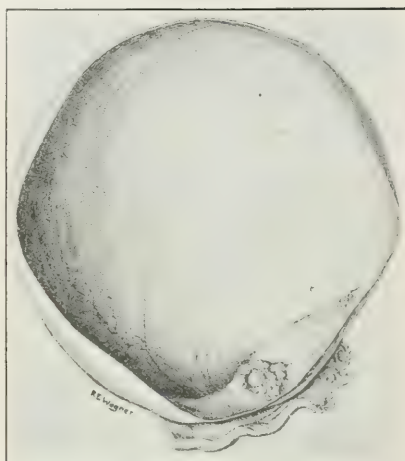


Fig. 2.—Ovarian Cyst with early epithelial new growth upon the inner surface of the cyst wall. This is an early proliferation carrying high malignant potentialities.

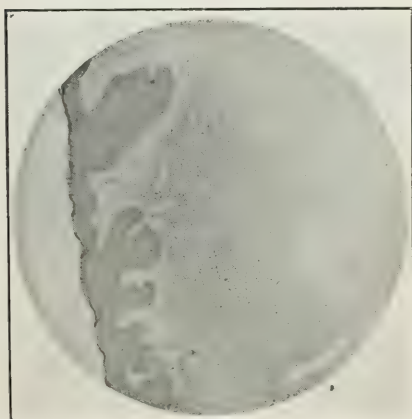


Fig. 3.—Early squamous cell carcinoma. Illustrative of growth below the basement membrane. Early fibrosis and small round cell infiltration of the stroma.



Fig. 4.—Epithelioma upon the cutaneous surface. The growth at the left of the section is very slow and shallow in depth and the surrounding hair follicles and sebaceous glands exhibit marked hypertrophy. The connective tissue is aged. Illustrative of slow growth, low grade malignancy and high resistance in the local tissues.

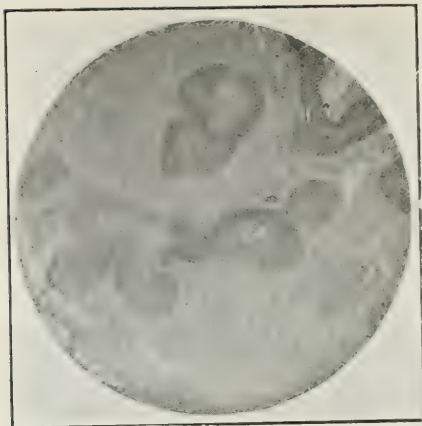


Fig. 5.—Basal-celled carcinoma. The new growth tissue is irregular in form and sharply demarcated. The growth is very slow and the connective tissue resistance is high, controlling rapid extension.

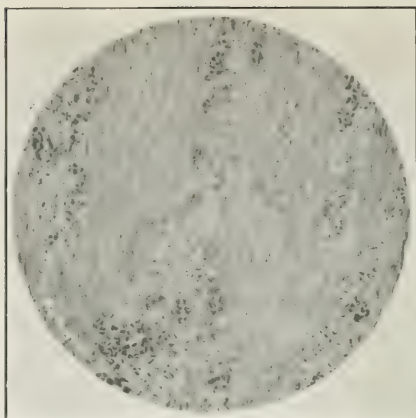


Fig. 6.—Scirrhus carcinoma of the stomach. Twenty years ago the patient developed carcinoma of the mammary gland and submitted to a radical operation. Ten years later panhysterectomy became necessary for carcinoma of the uterus. Ten years after this, symptoms of carcinoma of the stomach appeared. No operation was done for this condition. At autopsy neoplasia of the stomach, with marked extensive induration, was found. The photomicrograph exhibits an interesting involvement of the stomach muscularis, with atrophy, hyalinization, connective tissue increase and new growth epithelial cell infiltration.



Fig. 7.—Adenocarcinoma of the rectum. The right upper part of the section exhibits catarhal and resistance changes. The lower left half has new growth glands with excessive production of epithelium. Illustrative of poor differentiation, atypical glands and perverted epithelium.



Fig. 8.

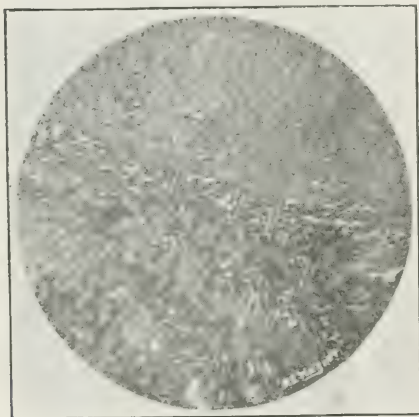


Fig. 9.

Figs. 8 and 9.—Lymphoblastoma (a malignant solid tumor of the ovary weighing 480 gms.) from a patient five years of age with a history of three communicable infections. Her mother had two miscarriages at three and one-half months and also some kidney pathology. The tumor symptomatology has extended over a brief period of but five months and metastasis had already become established. Advanced ageing of contiguous tissues has taken place. The cell structure is lymphoblastic in type, blood vessel wall stroma is abundant but maintenance of a blood circuit has failed to keep pace with the rapid tumor cell growth. The lighter hazy area represents degenerative changes from loss of nutrition. Illustrative of hereditary stigmata; diminished resistance from infections; intensive malignancy.



The reaction of connective tissue to epithelial neoplasia, before and after its invasion, is significant and important. The increased cellularity, invasive and extensive growth, hypernutrition, diminished elasticity, changed chemistry, cicatrization, induration and fixation are to be regarded as expressions of a defense mechanism, instigated by cell enzymes or other products. Epithelial cell disintegration stimulates phagocytic and proliferative connective tissue reaction and the latter in turn may probably cause increase of dynamic growth power, without a corresponding increase of nutrition.

The sharp contrast and the physical integrity in relative positions of epithelium and connective tissues should be maintained for normality of resistance. A militaristic vertical polarity of the epithelial cells upon their basement membrane, with maintenance of their average size, form, staining reaction, nuclear division forms, and protoplasmic cohesiveness are important criteria used in judging the normality of the epithelial tissue. There must also be growth impulse conforming to the established functional equilibrium of body economy.

Gifford<sup>3</sup> says "the intrinsic processes have five basic properties of growth, development, reproduction, nutrition and immunity." All pathologic changes connected with these processes are conveniently studied in two groups: inflammation and neoplasia. But why two? The essentials are similar, the etiology of traumatic irritation, parasitic invasion, or other factors, differ only in their time exposure. With adequate severity of irritant and sufficient periodicity of exposure, there is production of tissue unbalance, lawlessness and dynamic cell growth, a process which terminates only by supreme body unit antagonism, cessation of its nutritional supply, or body death. The clinical recognition of long continued cell irritation and unbalance of tissue is too frequently delayed until after the expression of organic functional disorder. The determination of stressed or irritated tissue potentiality should have much attention. The determination of sensitization, acidity and oxidation reactions are essentially quantitative tests which have relational value in this problem. It is mainly a quantitative difference in the energy and the irritation time factors that exists between regenerating and cancerous cells, and it is this difference we should carefully estimate.

Physiologic growth, regeneration, and neoplasia utilize the same means to produce a product, and resistance is an essential cause for all three. Normal growth is production under control, regeneration is production to control, and neoplasia is production without control.

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## THE PREPARATION OF THE SKIN FOR OPERATION WITH SPECIAL REFERENCE TO THE USE OF PICRIC ACID\*

By H. W. HEWITT, M.D., DETROIT, MICH.

SUCCESS in surgery, as in all walks of life, depends to a large extent upon the observance of details. While the actual technic of a major operation is highly important, only slightly less important are all of the minor essentials entering into that operation. Beginning with the preparation of the patient for operation until the final dressing is applied in the operating room, eternal vigilance is the price of success. If any mistake is made either in asepsis or technic, the operation may be a failure; if the wound does not heal by first intention, not only will the patient be required to spend many needless days in the hospital, but in abdominal operations a hernia may result, necessitating a second operation. It is the purpose of this paper to take up only one of the phases of surgical technic, viz.: the preparation of the skin for operation.

In the early days of surgery the preparation of the skin was accomplished by mechanical cleansing, using soap and water; later, chemical sterilization was added. In the last few years, however, mechanical cleansing has been largely given up, and in its place the much simpler and more efficient method of chemical antisepsis is in vogue. Sterilization of the skin is a relative term only, and will be so used in this paper because it is well known that many germs find their natural habitat in the hair follicles and sweat glands, and cannot be destroyed by any known germicide.

The earlier chemicals employed were carbolic acid, ether, alcohol, the salts of mercury and silver, and many others. In later years, salicylic acid, formaldehyde, betanaphthol, permanganate of potash, oxalic acid, iodine and various solutions have found favor. More recently, malachite green, acriflavine, pieric acid and antiseptics of the chlorine group have been used a great deal. Tincture of iodine, or iodine in benzine, has been used perhaps more extensively than any other antiseptic of the past decade. The ideal skin germicide has as yet not been discovered, all have disadvantages; the most efficient, and at the same time the least irritating, is the one that should be employed.

Among other factors entering into this problem, two stand out conspicuously; one is the efficiency of the antiseptic used, the other, the ability of the patient to resist infection. No matter how good the antiseptic may be, if the patient's resisting power is low the wound

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may break down and infection take place. The writer has, for some time past, been experimenting with different solutions for skin disinfection. It seems clear that a good preparation for disinfecting the skin should possess the following properties, viz.: (1) It should be simple, easy of application and efficient. (2) It should have the power of destroying the common skin organisms in a comparatively short time, and it should be sufficiently powerful to keep the skin sterile during the operation. (3) It must not macerate or injure the skin in any way. (4) Used in laparotomies, it must not injure the peritoneal coat of the intestine should this accidentally come in contact with it. (5) It should be of universal application. (6) It should contain no proprietary preparations, since these are of unknown strength and cannot be depended upon. (7) It should be standardized so that its antiseptic value may be known. Solutions may be standardized by the Walker-Rideal method.

Now, of all the methods of skin sterilization and chemicals in use today, very few approach this standard. Bichloride of mercury in aqueous solution will not sterilize the skin; in Harrington's solution it is efficient, but Harrington's solution contains hydrochloric acid and injures the skin to a greater or less extent. The writer has used Harrington's solution extensively and discarded it. Tincture of iodine, or a solution of iodine in benzine, has many disadvantages, viz.: (1) It not infrequently blisters if applied to sensitive skin, such as the scrotum, the vulva, or the axilla; it may injure the skin in other parts of the body so severely as to become entirely useless. (2) A careless assistant, while preparing the patient, may allow a few drops of the iodine to flow around on the patient's back and a blister may form. (3) If the peritoneal coat of the intestine comes in contact with the iodine, or even with the fumes of the iodine, adhesions may form. The writer recently had one such case, in which extensive postoperative adhesions occurred in consequence of this. (4) If iodine is used in less than 4 per cent strength, it does not sterilize the skin, as has been shown in our laboratory experiments. Where iodine is used, it should be carefully neutralized with alcohol before the operation is started. MacDonald's solution has been very popular, but in our hands inefficient. The fault with MacDonald's solution is that it contains pyxol as its chief ingredient. Now pyxol is a proprietary preparation, and is of unknown strength; this in itself is sufficient reason for discarding it. Ether will sterilize the skin, but will not keep it sterile throughout even the shortest operation. Ethyl alcohol is also inefficient. And so on with many other antiseptics.

About three years ago, the writer's attention was attracted to picric acid as used in the British Army. Chemically, picric acid is known as trinitrophenol, its formula is  $C_6H_2(NO_2)_3OH$ , and it is soluble in 95 parts of water and 16 parts of alcohol. It has been used, to a large



extent, in the treatment of burns, and is known as a parasiticide. It is also astringent and deeply penetrates the corneous layer of the skin. Its only disadvantage has been in staining the skin, an effect which will last from 12 to 18 days; but this may be removed by the application of a 5 per cent solution of carbonate of soda, or a 25 per cent solution of ammonia in ethyl alcohol, provided this is done immediately after the operation is finished. The picric acid solution used in these experiments and in our clinic was made by saturating a 70 per cent ethyl alcohol solution with picric acid, which made a 6 per cent solution.

In order that a comparison of the relative values of different antiseptics might be had, an attempt was made to supplement the work of others by additional laboratory experiments, thus to determine: (1) The approximate length of time required to sterilize the skin by the antiseptic used. (2) The approximate length of time the skin would remain sterile after the antiseptic had been applied.

For each experiment three areas of skin were selected, a scraping made from each, and placed in culture media; these were used as controls. Then, one of these skin areas was treated with the antiseptic for one minute, a second area for two minutes, and the third area for three minutes. All were washed with sterile water to remove any excess of antiseptic, scrapings were made and placed in culture media. The media used were 1 per cent glucose agar, 1 per cent glucose bouillon and blood serum. Using fresh skin areas, the tests were repeated five or more times for each antiseptic. The following experiments were tried: (1) Soap and water, scrubbing for fifteen minutes. (2) Ethyl alcohol in various strengths from 50 to 95 per cent. (3) Ether. (4) Tincture Iodine 3 per cent. (5) Tincture Iodine 7 per cent. (6) Iodine in benzine. (7) MacDonald's solution. (8) Picric acid solution in ethyl alcohol, 6 per cent strength. (9) Ether, three minutes, followed by picric solution, three minutes.

Time will not permit the reading in detail of these experiments, therefore a brief summary will be given. The experiments were repeated five or more times for each antiseptic used, and in each experiment six cultures were taken as follows: Antiseptic applied for one minute, culture taken. Antiseptic applied for two minutes, culture taken. Antiseptic applied for three minutes, culture taken. Sterile gauze applied, culture taken after one-half hour, one and two hours respectively. In general the results were as follows: (1) After scrubbing with soap and water for fifteen minutes, all cultures were positive. (2) Ethyl Alcohol: (a) Applied for one minute, all cultures from epidermal scrapings were positive. (b) Applied for two minutes, all immediate cultures except one were positive. (c) Applied for three minutes, all immediate cultures were negative. Cultures after one-half hour, all positive. Cultures after one hour, all positive. Cultures after

two hours, all positive. (3) Ether: (a) Applied one minute, all immediate cultures positive. (b) Applied two minutes, four negative, one positive. (c) Applied three minutes, all negative. Cultures after one-half hour, all positive. Cultures after one hour, all positive. Cultures after two hours, all positive. (4) Tincture iodine 3 per cent: (a) Applied one minute, all immediate cultures positive. (b) Applied two minutes, all negative. (c) Applied three minutes, all negative. Culture after one-half hour, four positive, one negative. Culture after one hour, all positive. Culture after two hours, all positive. (5) Tinct. Iodine 7 per cent: (a) Applied one minute, all immediate cultures positive. (b) Applied two minutes, all negative. (c) Applied three minutes, all negative. Culture after one-half hour, all negative. Culture after one hour, all negative. Culture after two hours, all negative. (6) Iodine in Benzine: (a) Applied one minute, immediate culture negative. (b) Applied two minutes, culture negative. (c) Applied three minutes, culture negative. Culture after one-half hour, negative. Culture after one hour, negative. Culture after two hours, negative. (7) MacDonald's Solution: All cultures negative. (8) Pieric Acid in Ethyl Alcohol 6 per cent Solution: (a) Applied one minute, all positive. (b) Applied two minutes, four positive, one negative. (c) Applied three minutes, all negative. Culture taken after one-half hour, where soap and water was first applied, all positive. Culture taken after one-half hour where pieric solution was applied to dry skin, all negative. Culture after one hour, three negative, two positive. Culture after two hours, three negative, two positive.

At this stage a change was made as follows: The skin was treated for three minutes with ether, followed for three minutes with pieric acid solution, and all cultures were negative, so this technic was adopted in all of the operations here reported. If the patient entered the hospital twelve or more hours prior to operation, the operative field was shaved, scrubbed with soap and water, and a thin sterile dressing applied. In emergency cases the preparation consisted of a dry shave, scrubbing with ether for three minutes, followed by pieric acid for three minutes, and the results seemed to be equally good.

The skin in a series of 269 surgical cases was so prepared. These were all major operations, and may be classified as follows: Appendectomy, 92 cases; breast (excision benign tumor), 5 cases; breast (amputation for carcinoma), 8 cases; cesarean section, 5 cases; cholecystectomy, 9 cases; gastroenterostomy, 3 cases; hernia, inguinal, 22 cases; hernia, ventral, 2 cases; hernia, umbilical, 1 case; hysterectomy, abdominal, 29 cases; intestinal obstruction, 3 cases; laparotomy for adhesions, 2 cases; myomectomy, 2 cases; nephrectomy, 1 case; shortening round ligaments, 16 cases; operation on the tubes and ovaries, 21 cases; vaginal plastic operation, 36 cases; a total of 269 cases.

Every wound showing even the slightest discharge was cultured.

In all thirty-one cases, twenty-three were found sterile; eight infected. These are as follows: (1) Complete hysterectomy for multiple fibroids: colon bacillus. (2) Salpingectomy: mixed infection—staphylococcus and colon bacillus. (3) Salpingectomy, bilateral: staphylococcus albus. (4) Appendectomy: staphylococcus albus. (5) Appendectomy: staphylococcus albus. (6) Herniotomy: staphylococcus aureus. (7) Cesarean section: staphylococcus albus. (8) Amputation of breast: staphylococcus albus.

The wounds which discharged and were found sterile upon culture were considered as healing by first intention, as healing took place promptly after the discharge was evacuated. We had then, eight infections in 269 cases, or slightly less than 3 per cent, and we found that these figures compared favorably with those from other clinics.

The merits of this method of preparation are many, viz.: It is simple; cheap; efficient. It does not injure the skin in any way, and may be used on any part of the body; it does not injure the peritoneal coat of the intestine; it contains no proprietary preparation, and its antiseptic strength may be standardized.

This is only a preliminary report. The staff of Grace Hospital, Detroit, have used this preparation, up to August 1, 1920, in 926 cases, and it is now the adopted method of skin preparation in that hospital. The number of cases reported is still too small to justify definite conclusions, but the writer hopes at some future time to report a series sufficiently large to be of clinical value.

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(For discussion, see p. 739.)



REPORT OF CASES OF POSTOPERATIVE CONVALESCENCE  
COMPLICATED BY FAULTY FUNCTIONING  
OF THE DUCTLESS GLANDS\*

BY CHARLES L. BONIFIELD, M.D., CINCINNATI, OHIO

**I** QUOTE the following paragraph from my Presidential Address, delivered in 1915:

"One of the improvements to be made in the future of surgery is a more accurate way of estimating the surgical risk in a given case. It is well known that certain individuals withstand operations from which a majority of people would die. Others succumb where the majority would survive. We are able to recognize some of the conditions of the heart, the lungs, and the kidneys that render one a poor surgical risk. A knowledge of the blood pressure is also valuable. But there is still something that eludes our present means of investigation. Because our methods of estimating the risk are still incomplete and imperfect, is no reason for neglecting to use those we have to the best advantage. The surgery that the masses receive is not the surgery of a few selected leaders with special endowment by nature, special training, and special facilities. I think it can be safely said that the average patient, when she consults a surgeon, has her heart and lungs not very carefully listened to by the surgeon himself. Then she is sent to the hospital, and the interne is instructed to examine the urine. This, by some internes, is conscientiously done; by others, I am sure, the examination amounts to little more than looking at the urine. Not infrequently the recognition of some abnormality other than the one for which the operation is to be performed, would lead to its postponement, and suitable preliminary treatment would change the risk from a very poor one to a comparatively good one; and this in turn, would give a lessened mortality rate in the year's work."

CASE I.—Mrs. C., age twenty-five, had been married for about two years; had taken training as a nurse before her marriage; came to my office, complaining of discomfort in the pelvis. She had been under the care of a young physician, who had diagnosed pregnancy. She gave a history of having been in an auto accident five years before, and her pelvis was supposed to have been fractured, and she was said to have some internal injuries. A year later a paralysis of the right leg and arm developed, and persisted for three months. She also gave a history of measles and scarlet fever during childhood; and tonsillitis and rheumatism about the age of ten; her heart action was rapid, but otherwise normal. Pelvis examination showed both appendages inflamed, and bound down by adhesions. She was

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passing a very large quantity of urine, a condition which had come on very suddenly about a month previous to my seeing her. The urine was examined several times, with the uniform result of finding it to be of low specific gravity, and neither albumin nor sugar present. I therefore, made a diagnosis of diabetes insipidus, and advised an operation for her pelvic condition. She entered the Good Samaritan Hospital on December 1, 1919. I curetted the uterus, removed the left tube and ovary, amputated the distal third of the right tube with a small portion of the right ovary, and removed the appendix, all under ether anesthesia. The operation lasted forty minutes; she left the table in good condition. The next morning I found her extremely restless, very rapid and weak pulse, and semiconscious. The interne was giving her saline solution, subcutaneously. Her chart showed that she had passed an enormous quantity of urine, and she was evidently quite dehydrated. I ordered that she be given artificial vichy water by the mouth, saline solution by the rectum constantly, and subcutaneously, when absolutely necessary, and that she be given a hypodermic of one c.c. of pituitrin. She responded to this treatment very promptly, and in a few hours the clinical picture had entirely changed. I found that one c.c. of pituitrin, given hypodermically every six hours, controlled both the nervous symptoms, and the output of urine. I tried giving it to her by the mouth, but it had no effect. I therefore kept her constantly under its influence, until she had made a surgical recovery. Then she was placed under the care of Dr. John Greiwe, a skillful internist, who treated her in the hospital with some benefit for a number of weeks. I saw her in June; she was looking well, and said she felt so, but the excessive secretion of urine still persisted.

CASE II.—Mrs. H. C., Williamstown, Ky., was brought to my office by her family physician, Dr. O'Hara. She was 29 years old, married, and had one child, five years of age. After physical examination, I made a diagnosis of chronic appendicitis, retroversion of the uterus, and inflamed tonsils. She entered Good Samaritan Hospital, and on March 19, 1920, I removed her appendix, did a Gilliam operation on the round ligaments, and Dr. Robert Stevenson then proceeded to remove her tonsils. The anesthetic was nitrous oxide, followed by ether. There was some shock following the operation from which she rallied rather slowly. At 6 P.M. her temperature had not yet returned to normal, pulse 82; at 11:30 P.M., her temperature had reached 100°, and her pulse 102; at 3 in the morning her temperature had gone up to 103°, pulse to 144. The patient was exceedingly nervous. At first I was inclined to attribute her temperature and rapid pulse to some absorption from the tonsil operation, but after observing the case for some hours, made a diagnosis of hyperthyroidism. I prescribed one-eighth of a grain of protiodide of mercury every six hours, and 30 grains of bromide of sodium, by rectum, at about the same intervals. On March 22nd, the temperature had dropped to 99°, and pulse to 108, and her nervous symptoms were rapidly subsiding. From that time on she made a speedy recovery, without showing any evidence of infection in the peritoneal cavity, or in the incision.

CASE III.—Miss D. W., of Loveland, Ohio, was brought to me by Dr. Coleman of that town. After a physical examination, I made a diagnosis of chronic inflammation of the gall bladder and appendix. On June 22, I drained the gall bladder, and removed the appendix. She left the table in good condition. At 6 o'clock her temperature was 100°, and pulse 104. The following morning her temperature was 100°, and pulse 124. She was exceedingly restless, but the gall bladder was draining nicely. She was able to void urine, and her abdominal condition was entirely satisfactory. She was given 30 grains of sodium bromide by rectum, and as that did not control the restlessness, one-fourth of a grain of morphine was given hypodermically. The third day her temperature was still 100°, and pulse 168. The mor-

phine and atropine were continued and digifolin was given also to slow the pulse. Her condition was precarious when I left the city for my summer vacation on June 30. After my departure, my associate, Dr. Frank M. Coppock, and Dr. John Greive took care of her, continuing treatment along the same lines. For a few days she was absolutely insane, but this suddenly passed away, and she recovered rapidly from that time on. I met her about a week ago. She was looking well, and feeling good.

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## THE TREATMENT OF ABORTION COMPLICATED BY SEPSIS\*

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**I**F WE compare the various methods adopted for the treatment of abortion, complicated by sepsis in different hospitals, or even those methods employed by the individual members of the staff of a single institution, we cannot fail to be impressed by the lack of uniformity of these procedures, and will doubtlessly conclude that as yet no standard treatment for this condition has been reached or agreed upon. Likewise the literature bearing upon this subject, shows a lack of uniformity of opinions that would indeed be confusing if one had not the convictions born of experience with this particular affection.

We must conclude then, that this field is divided into two camps as it were;—the older, and until quite recently the stronger numerically, holding that every vestige of the products of pregnancy in the infected uterus must be promptly and thoroughly removed; while the other maintains that this infection is not dependent upon the mere presence of these products of pregnancy, and that the practice of their forceful removal is productive of serious and unwarranted harm to the patient.

If then the profession finds itself divided into these irreconcilable factions, in which of these groups will we as individual members find ourselves if we act according to the standards of our convictions and our practice of conscientious and scientific medicine and surgery?

For the purpose of clearness in this discussion, let us accept as a definition of the term "abortion," any pre-viable expulsion of the human ovum, and also when an abortion is accompanied by a rise in temperature to 101° F. (rectal) or 100° F. (mouth) which temperature cannot be attributed to any other condition, let us accept this as an abortion accompanied by sepsis. Let it be further understood that the end results and complications of abortion such as general sepsis, pyemia, parametritis, salpingitis and peritonitis, are not inclusive or essential to this discussion.

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Abortion, then, is but pregnancy interrupted, or cut short, and differs only in degree and not in kind from pregnancy at term; at the same time an abortion complicated by sepsis is comparable to puerperal sepsis and differs from it in degree only save for the fact that, in the former the products of conception may still be in utero. With this corollary then, are we not justified in viewing these two conditions side by side or, if you will, in parallel lines?

Let us turn for the moment to puerperal infection and its treatment as it is generally accepted and standardized today. How does it compare with the treatment in vogue twenty years ago? And how does the radical and aggressive treatment of abortion, complicated by sepsis as practiced by many today, compare with the treatment of puerperal sepsis of twenty years ago? The answer is obvious. Why then, has not the treatment of abortion, complicated by sepsis, kept pace with the treatment of puerperal sepsis? The reasons for this may be attributed perhaps to social and criminal influences but, in the last analysis, is it not ourselves who are responsible?

DeLee<sup>1</sup> in his discussion of puerperal infection in his treatise on obstetrics (1913) says: "For the past five years, I have practically dispensed with local treatment in puerperal infection, being convinced that it does much more harm than good. Only if the woman has uterine hemorrhage do I interfere, and then, by packing the uterus with a 2 per cent iodoform gauze to stop the flow and aid the expulsion of the retained mass causing it. This packing is repeated, if needed, daily for several days. After the foreign matter comes away when the gauze is removed, usually the temperature comes down, the patient's general condition improving. Only after local barriers are considered strong enough and involution of the uterus well advanced, is the removal of the retained material attempted. This is safe only after the temperature has remained normal for two or more weeks. One waits as long as possible. Nature often works wonders."

"It is gratifying to note that one voice after another is being raised against douches, curettage, and other local interferences with the process of healing adopted by nature, and the author hopes that the curet will soon be recognized as a criminal instrument in simple puerperal infection and that the other operations will be reduced to the one operation—to stop hemorrhage."

Let us now see how this principle of conservatism in the treatment of puerperal infection has been applied by some of our gynecologists to the treatment of abortion complicated by sepsis.

Ries<sup>2</sup> advocated it as early as 1909, and in a more recent article says: "While the active search for placental remnants in the uterus in all or the majority of cases of puerperal sepsis was the treatment in vogue years ago, the teaching largely accepted now is, 'hands off' the septic puerperal uterus except for serious hemorrhage! \* \* \* Cases

of abortion without fever may safely be left to spontaneous termination; the only contraindication being severe or protracted slight hemorrhage. Cases of septic abortion are no exception to this rule. \* \* \* They can terminate spontaneously during the fever, and the fever drops after the abortion."

Here we have a treatment for abortion complicated by sepsis that in all its essentials parallels that which is advocated for puerperal sepsis. Polak<sup>3</sup> also says in this connection: "For years, as we have already stated, we have considered that curettage of an incomplete abortion which is presumably infected, is an unsafe procedure, as by the use of the curet, we break through the protective leucocytic wall and spread the infection into the blood vessels and lymphatics of the uterus and into the parametrium."

Let us now turn to the consideration of the aggressive or radical treatment of this condition. Vineberg and Wiener,<sup>4</sup> as recently as 1917, in a joint communication say: "The treatment of febrile incomplete abortions on the second gynecologic service of Mt. Sinai Hospital, to which we are attached, has always consisted in emptying the uterus as early as possible. As we laid no stress upon the value of bacteriologic examination in these cases, it was only in especial instances that such an examination was made."

"When the period of gestation is less than eight or ten weeks, we employ branch dilators to dilate the cervix and, usually, use the placental forceps to remove the uterine contents, supplemented with the sharp curet to scrape away any tissue adherent to the uterine wall. We have no fear of the sharp instrument, our own conviction being that less traumatism is likely to be inflicted with the sharp curet, used with a light hand, than with a dull instrument that has to be vigorously applied. In cases more advanced than eight or ten weeks, we usually make use of a vaginal hysterotomy and then we have no difficulty in removing the uterine contents with the fingers, aided at times, with the placental forceps."

Darnall<sup>5</sup> advocates essentially the aggressive treatment as given above, but tempered with conservatism. He says: "The usual routine in our clinic, if pregnancy is more than three months advanced, and the infection not of a virulent type, is to do vaginal cesarean section, using the gloved finger to remove the products of conception. If three months or under, the cervix is rapidly dilated and the contents of the uterus gently removed with the small placental forceps."

Curettage, from being an operation which was performed for the slightest irregularity of function or other symptoms, has become one that is done only when clearly and definitely indicated; and it is no longer the custom of the surgeon who is doing an abdominal operation on the uterus or its appendages, to unlimber himself, as it were, by first doing a curettage. The reasons for this change are sound and sensible and are as applicable in the uterus that has undergone the

changes accompanying pregnancy as they are in the nonpregnant one.

Ochsner<sup>6</sup> says in his introduction to a recent volume on general surgery: "The importance of eliminating trauma to the greatest possible extent seems to be more fully appreciated in connection with all extensive operations than at any time in the past," but it is to Bumm<sup>7</sup> that we must give richly deserved credit for his protest against any intrauterine operation in the presence of sepsis that does not take into account the definite efforts made by nature to combat infection. He says: "The employment of the curet to the infected puerperal uterus should be restricted to the utmost. It is erroneous to scrape into account the definite efforts made by nature to combat infection. About 80 per cent of all streptococcus infections in the puerperium recover spontaneously for the organism develops in the decidua a sort of granulation wall of closely packed leukocytes which prevents the further penetration of the germs, and induces the desquamation of the necrotic surface of the decidua, thereby automatically cleaning the endometrium. Scraping with the curet disturbs the natural curative endeavors of the tissues, the protecting wall of granulations is broken through and the passage is again opened to the bacteria. In the presence of very virulent forms of streptococci, rapid transmigration of the uterine walls and fatal infection of the peritoneum can be caused in this way. In the less virulent streptococcus infections, the principal dangers exist in the tissue-lesions produced by the curet at the placental site leading to venous infection."

Fisher<sup>8</sup> says in discussing the treatment of septic abortions and puerperal infections: "To compare an infected puerperal uterus and its resultant offensive discharge with a sewer and its contained filth as is so frequently done in practice; and to add to this erroneous simile the statement that not, unlike the latter, the former should be relieved of its necrotic structure by a resort to scraping with the curet and antiseptic flushings, may impress those members of the profession who, owing to their busy activities in other lines of work, remain unschooled in uterine pathology, or may meet with favor among those whose clinical observations lead them to assume that all symptomatic recoveries are proofs of cures following treatment, while regarding attendant failures and the graver complications that so frequently follow this form of surgical interference, as accidental coincidences that should be attributed to anything else rather than to the evil consequences of their good intentions." \* \* \*

"It is generally conceded that in cases of true blood infection, no form of intrauterine treatment can in any way influence or prevent the spread of the morbid process; while in those cases with a uterine reactionary zone, any form of localized interference endangering its destruction, exposes the patient to an auto-infection (vaccination of the healthy uterine wall) with coincident involvement of the circulation and a generalized reaction."



Here we have the practical application of the principles laid down by Bumm in the conduct and treatment of all septic uterine infections whether they be in abortions or in the puerperal state; but with all this evidence in mind, *pro* and *con*, the writer, from his practice and observations, adheres to the conservative and expectant form of treatment of these cases of abortion complicated by sepsis, and for several years, has adopted the following general plan:

*Diagnosis*, by history taking and confirmed by vaginal examination after shaving and cleansing of the vulva, is routine practice and of primary importance; noting the condition of the cervix, adnexa and amount and character of discharge; a vaginal and cervical smear are usually taken at this time as a matter of interest for determining the microorganisms present. *Posture*. The Fowler position is regularly employed for drainage of the uterus and for relaxation of the patient. *Diet* is restricted to water, orange juice, bouillon and dry toast until temperature falls and capacity for digesting and assimilating food returns. The *bowels* are moved by an s.s. enema when desired. *Pain* is controlled by morphine sulphate gr.  $\frac{1}{8}$ , hypodermically, repeated on order only. The *vulva*, after being cleansed and shaved, is protected by a sterile pad which is not put back when once removed, and which is changed every twelve hours and more often if soiled. *Douche*. A vaginal douche of potassium permanganate, 1-5000, at a temperature of 110° F. is ordered for offensive discharge, or for other reasons when indicated, otherwise no douche is given.

Following the adoption of this expectant or conservative treatment, even though sepsis be present, the abortion may terminate spontaneously as in a case without this complication. The temperature curve steadily and gradually falls, and there is a general improvement in the condition of the patient. Each and every day of such treatment aids in the formation and development of the reactionary zone, and in an apparent diminution in the force and virulence of the infection. *Hemorrhage* when it occurs in any considerable amount cannot be disregarded, but the method employed for its control, is determined by (a) the condition of the cervix, as to whether dilatation has become sufficient for emptying the uterus or not; and (b) the length of time the patient has been under treatment and the effect of this treatment upon the temperature curve.

Vaginal packing of iodoform gauze (2 per cent) is employed when dilatation of the cervix has not taken place, also in cases where much blood has been lost, packing of the cervix and vagina with iodoform gauze may be employed, especially when the patient has recently come under treatment and the employment of instrumental removal of products of conception is thought to be too great a hazard. After dilatation is complete, and the products of conception have not been spontaneously expelled, the finger may be gently introduced within the uterine cavity and its contents thus removed. Failing in this,

at least a separation of the foreign body can usually be effected, and its removal accomplished with placental forceps. In hemorrhage, at the third month, or beyond, with incomplete cervical dilatation, the employment of a dilating bag that will plug the cervix is considered preferable to rapid and forcible dilatation, or to vaginal hysterotomy. The severity of the hemorrhage and the condition of the patient will determine the course.

In the beginning of the expectant treatment, while the temperature is still high, intrauterine manipulations are avoided, if possible. Later on, however, when the temperature is less, or has disappeared, mechanical intrauterine interference for hemorrhage may be undertaken with comparative safety. When the patient is received late in the febrile state, and *after* a curettment has been performed, the expectant treatment alone is applicable, but here one is most likely to meet with the deeper, or general, infections with their usual complications and sequelæ.

Conservatism in the treatment and consideration for nature's efforts in these cases of abortion with sepsis, will not only give the best results finally, but one avoids being accused of being responsible for the unhappy results that must follow criminal interference with pregnancy,—a condition with which septic abortions are inseparably associated. The advantages of the conservative treatment to the practitioner who cannot avail himself of the benefits of hospital care in the management of these cases, are also worthy of consideration.

#### CONCLUSIONS

1. The conservative treatment of abortion complicated by sepsis is based on pathologic entities and clinical end results.
2. Hemorrhage is the only symptom that may demand a prompt and thorough emptying of the uterus for its control.
3. Every intrauterine manipulation or procedure should be executed with the greatest care to avoid traumatizing and otherwise injuring the endometrium.
4. Late cases, and especially those already subjected to curettement, are eminently suitable for this form of treatment.

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AN ANALYSIS OF TWO HUNDRED GYNECOLOGIC CASES  
TREATED WITH RADIUM AT THE WOMAN'S HOSPITAL  
IN THE STATE OF NEW YORK\*

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THROUGH the beneficence of the Board of Governors two hundred and thirty milligrams of radium element were put at the disposal of the Surgical Staff of the Woman's Hospital, February, 1919. From that date to August, 1920, a period of eighteen months, it has been used in two hundred and one cases of malignant conditions and non-malignant uterine hemorrhages. At the suggestion of Dr. George Gray Ward, Jr., Chief Surgeon of the hospital, an attempt at a thorough analysis of these cases has been made. The task of studying these cases has been a comparatively easy one, due primarily to the splendid record system in use at the hospital. The record of a case includes history, physical findings with accurate description of the lesion, pathologic diagnosis, amount of radium used, screening, duration of exposure, and carefully recorded physical and subjective findings at each subsequent reexamination. All cases admitted to the wards in which the application of radium is deemed advisable are assigned to the first surgical division of the Hospital under the supervision of Dr. Ward. This plan was adopted to insure a greater degree of uniformity in the method of application than could be expected in the care of these cases divided among the several surgical divisions of the Hospital.

TYPES OF CASES TREATED WITH RADIUM

1. Carcinoma of the genital tract.
2. Myoma uteri.
3. Functional menorrhagia and metrorrhagia.

I. CARCINOMA OF THE GENITAL TRACT

*Carcinoma of Cervix.*—*Indications.* (1) As a palliative in the inoperable and recurrent cases. (2) In operable cases as a preliminary to operation or as a prophylactic after operation, or both. (3) In operable cases where there exists an operative contra-indication.

*Technic of Application.*—The radium salt, an insoluble sulphate, contained in a glass capsule, is enclosed in a silver tube, each being 5 mm. in thickness. This, in turn, is placed in a brass jacket 1 mm. thick and secured in a pure rubber tube with braided silk of such length

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that it may be removed with ease. Sterilization is accomplished by allowing it to remain in 95 per cent alcohol for a few minutes before introduction. The patient is prepared as for a vaginal operation. If necessary light anesthesia is given, nitrous oxide and oxygen preferably, and a specimen of the carcinomatous tissue is removed with a punch for pathologic examination. The radium is then placed in the cervical canal or crater and held in place with gauze packing. The vagina is fully distended with gauze to protect the bladder and rectum.

*Dosage.*—We have from the beginning used a minimum dose of one hundred milligrams for twenty-four hours. The exposure is repeated in from six weeks to three months, depending upon conditions found at reexamination. None of our cases has had more than three exposures.

*Follow-up Cases.*—Before being discharged from the Hospital an effort is made to impress upon these patients the importance of returning to the follow-up clinic. Monthly examination with careful recording of subjective and physical findings is made.

*Constitutional Reaction to Application.*—In only a small percentage of cases have we observed marked constitutional reaction to the exposure to radium. Vomiting has occurred in 25 per cent of the cases during the first 24 hours, which ceased on removal of the radium, but it has persisted several days in 7 per cent. Slight elevation of temperature and vague abdominal pain is present in a small proportion, but the number of cases in which these two symptoms were marked, corresponds to those of prolonged vomiting and remained about the same length of time. Bladder and rectal irritation occurred occasionally, but is rarely of any consequence. The onset of this irritation is usually delayed for from 8 to 10 days following treatment. It can be avoided to a very great extent if due care is taken in protecting these organs. The importance of carefully emptying the lower bowel previous to introduction of radium and of not allowing the bladder to become distended during the exposure is often disregarded and is probably accountable for these symptoms.

*Symptomatic Relief.*—As in the experience of others, we have found hemorrhage more easily controlled than other symptoms. With one or two exceptions hemorrhage has immediately diminished and completely ceased within four weeks of time of application. Leucorrhea persists for two or three weeks, gradually lessening, becoming watery in character, less offensive in odor, and disappearing in five to six weeks.

*Pain.*—Sixty-four per cent of cases complaining of pain previous to radiation have been relieved of it. In less than 3 per cent pain has continued. Palliating and abolishing pain has been one of its most valuable properties. Not only does it avoid the necessity of using narcotics in a great many patients, but it allows the discontinuance in a few and

reduces the amount necessary in others. With the disappearance of symptoms, improvement in general health takes place.

*Effect on Lesion.*—Within four weeks the lesion becomes altered in character, the mass has contracted and diminished in size, sloughing tissue disappears, and gradually healing takes place. In approximately three months the original site of the lesion is nearly normal in appearance, or is seen as a cicatrix. This is the picture of what may be termed a typical result.

*Sequelæ Attributed to Radium.*—We have had only two fistulæ in our cervix cases. One carcinoma of rectum developed a rectovaginal fistula and a carcinoma of bladder a vesicovaginal fistula. There is no doubt but that the percentage of fistulæ after radiation, is less than in patients untreated or treated by other means.

*Ultimate Results.*—On account of insufficient time elapsed since treatment was begun in our cases, we are unable to make deductions as to ultimate results. Palliatively, our results correspond with others. We have observed an early and decided benefit in stopping hemorrhage and offensive discharge and controlling pain, and a consequent improvement in health. Eight per cent of the cases showed progression of the disease, but we have seven cases of advanced carcinoma that exhibit clinical cures a year or more after treatment.

*Preoperative Radiation.*—Cases in which radiation was followed by Wertheim operation number five. These fall in the operable class, being radiated from two to five months after appearance of symptoms and operated upon six weeks to a few months after radiation. One death from shock followed operation. This case more nearly approached the borderline than the others, radium treatment being given five months after onset of symptoms. The uterus was found freely movable and no glands present. This patient was obese, weighing 206 lbs; length of operation was 2 hours 5 minutes. She showed signs of cardiac and respiratory failure at the close of the operation and died two hours later from shock. Pathologic study of specimens removed, showed metastasis to pelvic lymph glands in one case; two cases showed masses of cells in cervix surrounded by dense fibrous tissue and in one this was present throughout the fundus. Atrophy of ovaries was marked and a complete absence of oval follicles in all but one. As a rule we have not found unusual difficulty in isolating ureters and freeing the bladder on account of adhesions due to the radium.

A brief summary of the following case is presented to bring out the effect of radium on the tissues as shown microscopically:

Mrs. P., thirty-two years of age, entered the Woman's Hospital Nov. 1918, at which time both tubes and the left ovary were removed and a retroversion was corrected by Dr. Byron Goff. In April 1919 she was sent into the hospital from the Follow-up Clinic where she had been under observation since operation. An erosion of the cervix was noted and a history of a bloody vaginal discharge of two months'

duration was elicited. A section from the cervix was reported "carcinoma" and May 2nd a 2400 milligram hour application of radium was made to the cervix. Wertheim operation was performed by Dr. Ward, Nov. 20th, and microscopic sections of the entire uterus, vaginal and parametrial tissues showed no trace of the original carcinoma.

*Results.*—

Total number of cases of carcinoma of cervix treated.....	86
Living less than 6 months after radiation .....	24
Living 6 to 12 months after radiation .....	24
Living 12 to 18 months after radiation .....	7
Died under 6 months after radiation .....	16
Died 6 to 12 months after radiation .....	9
Died 12 to 18 months after radiation .....	6

Of the deaths, two have been in cases with distant metastases; one lung, one liver. One death occurred two months after radiation from pneumonia following influenza. Seven cases are too recent to report upon.

*Carcinoma of Corpus Uteri.*—Our series includes nine cases of carcinoma of the corpus uteri which were radiated. All are living at the time of this report and, with the exception of two advanced cases, are clinically cured. Four cases had hysterectomy, one was radiated a few days prior to operation; two, a few days following operation; and one had preoperative and postoperative radiation. In three, the disease was considered too far advanced. One refused laparotomy and in one, operation was contraindicated on account of marked arteriosclerosis, having had a hemiplegia a few years ago.

One chorioepithelioma was radiated after hysterectomy, diagnosis was made subsequent to operation.

#### CARCINOMA OF OTHER ORGANS

*Carcinoma of Vagina.*—(Recurrent after hysterectomy). Five cases, —two living, one clinically cured over 12 months after radiation, and one free of symptoms over 6 months after radiation. Of the three that died,—one lived two months, and two, six months after radiation.

Two cases of *Carcinoma of Vulva* were radiated, one, after excision of vulva,—too early to report results. The other improved for a time, but later the disease extended.

We have treated three cases of *Carcinoma of the Urethra* and one of *Carcinoma of the Bladder*. Results have not been good, though a delay in progress of disease seems to have been accomplished.

*Carcinoma of the Breast.*—Unless hopelessly inoperable, a radical removal of breast should be done and followed by radium or x-ray radiation. The x-ray is probably preferable because a larger area can be radiated to better advantage. Three cases have been treated with radium a few days after operation. After being discharged from the Hospital they are given x-ray radiations. It is the opinion of Dr. Herendeen,



Roentgenologist to the Woman's Hospital, that it would, be of advantage to treat mammary carcinoma with x-ray, previous to operation as well as afterwards. One case died seven months after operation with extension to mediastinum. Two others are living and free from any evidences of recurrence one year after.

*Carcinoma of the Rectum.*—Five cases of rectal carcinoma treated with radium all showed improvement for a time; four are living, one over six months and three over a year after radiation. The one death occurred in a patient upon whom operation was deemed advisable owing to narrowing of lumen. Resection of recto-sigmoid was done and the patient died in shock.

*Comment.*—Though the consensus of opinion is still in favor of radical operation in certain early cases of carcinoma of the cervix, the most effective method is in the balance. Time only will decide whether radium alone is advisable. It is still too early to establish the question of final cures with radium, although a number of cures have been reported by others in which five years have elapsed since treatment. In the light of the knowledge of the action of radium in advanced cases, the question, why operate upon early cases of carcinoma of the cervix, may well be in order. From personal experience, though admittedly limited, and from a study of the literature, the writer cannot help but feel that the day is not far off when carcinoma of the cervix will be taken from the domain of surgery.

Janeway states, "Our present evidence indicates that radium destroys the disease at a greater distance than the knife is capable of removing it, and does this with no risk or inconvenience to the patient."

J. G. Clark makes the statement, "That within the next five years radium may possibly supplant the radical operation in early cases."

He still advocates radical operation a few days after radiation in the operable cases, after the plan of Dr. Howard C. Taylor.

Recassens, reporting nearly four hundred cases of carcinoma of the cervix treated in the last six years, thinks the treatment of choice is nonsurgical, stating that his results with radium therapy have been superior to those obtained by any other means.

Beuttner is of the opinion that operations could be dispensed with.

## 2. MYOMA UTERI

The treatment of these tumors, until recent years, has been surgical. In properly selected cases radium has been proved safe and efficient without the dangers of a laparotomy. In this series we have 44 cases, 15 under and 29 over 40 years of age. The preservation of ovarian function must be considered in selecting cases for radium.

*Types of Cases Selected.*—1. Those in which the uterus is circumscribed and not exceeding 4 or 5 months' pregnancy in size.

2. In larger tumors if there exists a contraindication to operation, such

as serious cardiac or renal disease, pulmonary tuberculosis, marked anemia or extreme obesity, radium alone or combined with deep x-ray therapy.

3. Radium is contraindicated in pedunculated subserous tumors and in myoma of young women that can be removed by myomectomy.

4. Myoma associated with pelvic inflammatory disease should not be radiated.

Radium has established a field for itself in cases in which hemorrhage is the only symptom.

Control of hemorrhage and shrinkage of tumor can be expected. We have radiated two cases of large tumors in which excessive loss of blood has produced such a marked degree of anemia that operation could not be considered.

*Technic of Application.*—The preparation of the patient is as for a vaginal operation. A diagnostic curettage is done and the curettings are subjected to microscopic examination to rule out malignancy. The radium is screened as for the carcinoma cases, with silver, brass and rubber. The tube (100 mgm. preferably two 50's in tandem) is introduced into the cavity of the uterus above the cervix and held in place with a narrow strip of gauze, and the vagina is likewise distended with gauze. The brass screen we consider important as will be shown later. Care should be taken to prevent distention of the bladder while the radium is in place. This can be done by causing the patient to void frequently, or if found necessary, frequent catheterization should be done.

*Duration of Exposure.*—The dosage is regulated by the existing condition and age is the most important governing factor. When it is desirable to continue menstruation, smaller doses are used than in those in whom the production of permanent amenorrhea is desired. In these cases amenorrhea is the guide to adequate dosage. We have found 1500 to 2400 milligram hours sufficient to produce amenorrhea and shrinkage of tumor. In young women, where the aim is to check a dribbling flow without producing amenorrhea, the exposure is shortened. In this class of cases we have used 200 to 600 milligram hours.

#### CONSTITUTIONAL EFFECTS OF APPLICATION

*Nausea and Vomiting.*—In 36 per cent of our cases, nausea and vomiting have been observed. It lasted several days in three, and in the others it has ceased abruptly with removal of the radium.

*Pain* in the majority of cases has been negligible. Less than 50 per cent have had sufficient pain to require morphine to control it. Abdominal tenderness for a few days is experienced by some.

*Elevation of temperature* is seen in 15 per cent, ranging from 99.5° F. to 100.5° F. for twenty-four to forty-eight hours.

*Leucorrhea.*—We have not observed the profuse leucorrhea lasting 5 or 6 weeks, as noted by others. Practically all of our cases have

had some watery discharge following radiation for one or two weeks. Only in an occasional case has it been noted at first return to the follow-up clinic, that is four weeks after radiation. We attribute this to the 1 mm. brass screening, giving additional distance as well as cutting off irritating beta rays. All cases in which leucorrhea was present before radiation were relieved of it.

*Menopause Symptoms.*—We have observed severe menopause symptoms in three cases receiving 2400 milligram hours and mild in 13 others which were given doses ranging from 1500 to 2100 milligram hours. These were patients nearing 40 years of age in whom the effort was made to obtain permanent amenorrhea. Indication of an abrupt menopause may be offered as an objection to radium therapy, but it differs in no way from the sequelæ where hysterectomy is done with the removal of both ovaries.

*Symptomatic Relief.*—The control of hemorrhage should be obtained in 100 per cent of cases, if properly radiated. In those cases in which large dosage is used, menstruation ceases immediately or there may be an irregularity for two or three months and then it stops entirely. In younger women where smaller dosage is used, if there is a cessation of menses at all, they may be expected to return, becoming regular and normal in two to four months.

*Effect on Tumor.*—A reduction in size occurred in all of our cases. Shrinkage is noticeable at the end of four or six weeks when the patient returns for the first reexamination and gradually continues over the course of several months to a year. In two cases the tumor has entirely disappeared so far as can be ascertained by palpation. Two cases of large tumors in which radiation was resorted to in an effort to control hemorrhage on account of anemia, were operated upon later, and notes at time of operation showed parametrial tissues to be more fibrous than normal.

### 3. FUNCTIONAL MENORRHAGIA AND METRORRHAGIA

Menorrhagia or metrorrhagia not of neoplastic origin and sometimes seen in so-called fibrosis uteri was treated until recently with rest in bed and the employment of certain medicinal agents and if no relief was obtained, these patients were subjected to surgical procedures. In those cases in which curettage or curettages were not effective, hysterectomy came next in line, be they young women who desired to retain power of reproduction or not. Radium has answered this question and with no more risk of life than a curettage. In young women the dosage is so regulated that menstruation is not stopped. In women nearing the menopause this is not so important and larger doses can be used with less discrimination. We have treated 39 such cases.

*Technic of Application.*—The method of application and screening is the same as in myoma cases. Diagnostic curettage is always done. The



dosage is governed by the age of the patient, the desired effect upon the menstrual function is the guiding factor.

*Influence on Menstrual Function.*—Experience has proved that intra-uterine applications of 600 mgm. hours (50 mgm. for 12 hours) is usually safe in women under 35. The desired result is achieved without other than temporary checking (2 to 4 months) of the menstrual flow. In one case, 35 years of age, a 400 mgm. hour application was followed by permanent amenorrhea. Another case of the same age a 900 mgm. hour (50 mgm. for 18 hours) application had no effect but it is interesting to note this patient was relieved of a profuse leucorrhea. As the age nears 40 larger doses are found necessary. One case 40 years of age, permanent amenorrhea followed a 600 mgm. hour exposure. Following large dosage the menstrual flow does not always cease immediately, in many cases it continues irregularly for two or three months, then it stops entirely. In cases where smaller doses are used menstruation frequently ceases, to return later and resume its normal course.

*Conception after Radiation.*—There is considerable difference of opinion in just what manner radium brings about results in these cases. The preponderance of evidence is in favor of changes produced in the endometrium by dosages not larger than 600 mgm. hours. Maury's recent experiments in exposing ovaries of rabbits to 50 mgms. radium for 12 hours showed no effect on follicles of ovary. Schmitz thinks the action of the rays of this dosage on the ovary is negligible, requiring at least 1200 mgm. hours to cause degeneration of follicles. He cites pregnancies following 600 mgm. hours radiation. The only pregnancy in our cases was one in which 200 mgm. hours of radium were used to improve an intractable endocervicitis. Discharges lessened, patient conceived eight months after radiation and aborted in third month. Curettage later showed a hydatid mole.

*Hemorrhage at the Menopause.*—In hemorrhage at the menopause radium is especially effective. Results in eight cases treated have been excellent, 1200 to 1800 mgm. hours of radium being used. Undoubtedly radium has considerably diminished the number of hysterectomies done for menorrhagia occurring at the menopause.

#### SUMMARY OF RESULTS

The results obtained correspond to those of others. Two hundred and one patients have been treated in a period of eighteen months.

*Carcinoma of the Uterus.*—Ninety-five cases, eighty-six of the cervix and nine of the fundus.

*Carcinoma of the Cervix.*—Living: 55 cases. Twenty-four are less than six months after radiation, all but seven of these are too recent to report, are healed and free of symptoms. Twenty-four others are between six and twelve months after radiation and seven between twelve and eighteen months.

Died: 31 cases. Sixteen died less than six months after radiation. Nine died between six and twelve months after radiation. Six died between twelve and eighteen months after radiation. Two deaths from distant metastases, one to the lung and one to the liver. Another death two months after radiation from pneumonia, probably influenzal.

*Symptomatic Results.*—Sixty-four per cent of those complaining of pain have been relieved. In 3 per cent of those complaining of pain, pain was increased. Hemorrhage and leucorrhea have been checked in all but two cases. Improvement in general health with the disappearance of symptoms. Recurrence of hemorrhage in six cases after four to six months.

*Sequelæ.*—Only occasionally bladder and rectal irritation was sufficiently severe to demand treatment. Two fistulæ resulted, one vesicovaginal, one rectovaginal.

*Ultimate Results.*—Seven cases of advanced carcinoma living and free from symptoms, clinically cured a year or more after radiation.

*Carcinoma of the Fundus.*—Nine cases, four had complete hysterectomy, one had preoperative and postoperative radiation. All clinically cured except two.

*Carcinoma of Vagina.*—Five cases, one primary and four recurrent after hysterectomy. Two living, one clinically cured after twelve months, and one six months. Three died, one two months and two, six months after radiation.

*Carcinoma of Vulva.*—Two cases, both living. One improved and later showed extension. One too recent to report.

*Carcinoma of Breast.*—Three cases treated after radical removal. One died seven months later of extension to mediastinum, other two free from recurrence after one year.

*Carcinoma of Urethra and Bladder.*—Results not so good. Relief of hematuria. Little effect on lesion.

*Carcinoma of Rectum.*—Five cases, improvement in all noted. Four living, one six months and three over one year after radiation. One died from shock of operation after resection of sigmoid.

#### NONMALIGNANT CASES

*Myoma Uteri.*—Forty-four cases; 15 under, and 29 over forty years of age. Control of hemorrhage and reduction in size of tumor in all. Disappearance of tumor in two.

*Menorrhagia and Metrorrhagia* under 40 years of age, 39 cases.

Dosage governed by age of patient. Small dose and repeat if necessary in young women. Control of hemorrhage in all but three cases.

One case, thirty-five years of age, 916 mgm. hours, no effect on menorrhagia.

Two cases, between thirty and thirty-five years of age, less than 400 mgm. hours, no effect; amount not sufficient.

*Influence on Menstrual Function.*—Six hundred mgm. hour application considered safe, one case 35 years of age had 400 mgm. hour application, permanent amenorrhea. One case 40 years, permanent amenorrhea following 600 mgm. hour application. Under 600 mgm. hours, menses usually return normally in two to three months. After larger doses it may continue irregularly for two to three months and then cease.

*Conception.*—One case following 200 mgm. hour exposure for chronic endocervicitis. Conception eight months later, abortion at third month, hydatid mole.

*Leucorrhea.*—All cases in which leucorrhea was present previous to radiation were cured. Watery discharge for one to two weeks following radiation.

*Menopause Symptoms.*—Severe in three cases which received 2400 mgm. hour exposure. Mild in 13 cases which received 1500 to 2100 mgm. hour exposure.

*Hemorrhage at the Menopause.*—Eight cases, results excellent, 1200 to 1800 mgm. hours used.

#### CONCLUSIONS

In carcinoma of the cervix radium has proved itself:

1. The most dependable palliative in advanced cases.
2. A reliable adjunct to surgery in the operable cases.
3. Capable of relieving pain and hemorrhage and prolonging life.

In properly selected cases of myoma uteri it is a strong rival of surgery.

In large tumors requiring operation, it will control hemorrhage and allow delay until there is an improvement in health.

In intractable menorrhagia of young women it has solved a difficult problem.

Mortality and morbidity in gynecologic practice has been materially reduced by the use of radium.

Its power to prolong life and restore a certain number of individuals to a useful life, makes it an economic factor to the State.

Radium may eventually remove carcinoma of the cervix from the domain of surgery.

THE ROCHAMBEAU.

(For discussion, see p. 750.)



## ON A CASE OF ADENOMA HIDRADENOIDES TUBULARE DESTRUENS

BY EMIL SCHWARZ, M.D., NEW YORK, N. Y.

*From the Pathological Laboratory of the Woman's Hospital*

THE case which I shall describe in detail deserves particular attention because of the very scant and insufficient references to similar cases in the English literature. Tumors of this kind are found in the labia and although their histologic picture has been known for several decades, as will be seen, their histogenesis and classification were first properly elucidated by Ludwig Pick in 1904. This author, after a painstaking and somewhat lengthy analysis of all the points in question, declared that two kinds of growths of characteristic location and structure were found not infrequently in the labia majora and minora one of which he called adenoma hidradenoides, having no definite histogenesis, the other type he derived from the sweat glands, calling it hidradenoma tubulare.

I shall refer to Picks' cases in the discussion of the histologic features of my own case later on. The first description of a neoplasm of the type in question was given by Werth in 1878. This was a cyst the size of a cherry in the sulcus interlabialis with a papillary mass the size of a large pea arising from the inner lining of the cyst wall. The columnar cell epithelium alternated with a flat epithelium which Werth correctly derived from the former, the flattening of the cells being caused by intracystic pressure. Werth gave a general explanation of the origin of the epithelial structures by assuming that they originated from aberrant epithelia which are not uncommon in this region of the genital organs. Another reference to a small papillary tumor in the labium majus is given in Gebhard's Textbook. The tumor was the size of a pea and was found accidentally by Olshausen. Gebhard mentions the similarity of the microscopic appearance to papillary cystomata of the ovary. MacGregor referring to Werth's case described a small translucent cyst with a papillated cylindrical cell lining whereby he mentioned the resemblance of the histologic structure to ovarian tumors. This author in his analysis of the case, made an error, doubtless inadvertently, in the statement that such ovarian growths are held to originate from the Wolffian body. Riche, in a report, derives his tumor from young sebaceous cells ("d'origine Malpighienne.") Fredet describes a tumor with a mucus-producing epithelium without making any particular reference as to its origin.

With this introduction, indicating the various views on the small cystic and solid tumor of the labia previous to Pick's cases, I desire

to present a detailed description of the growth of a labial tumor which occurred in a case at the Woman's Hospital.

Mrs. C. L., forty-three years of age, noticed a slight swelling in her left labium for the past six years. The swelling increased markedly in size, according to the

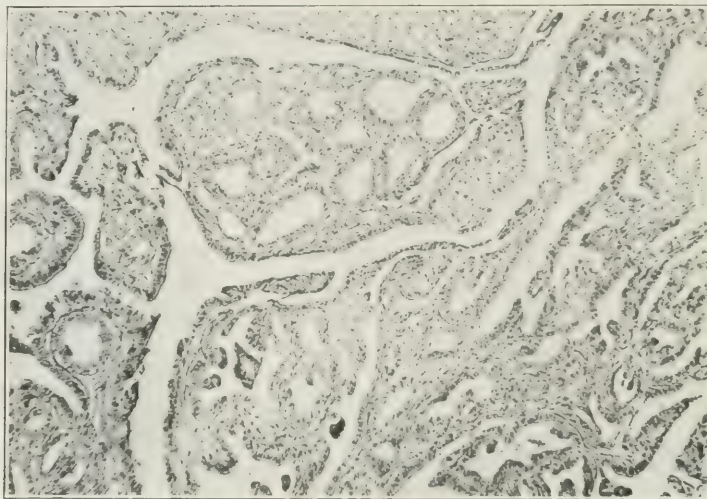


Fig. 1.

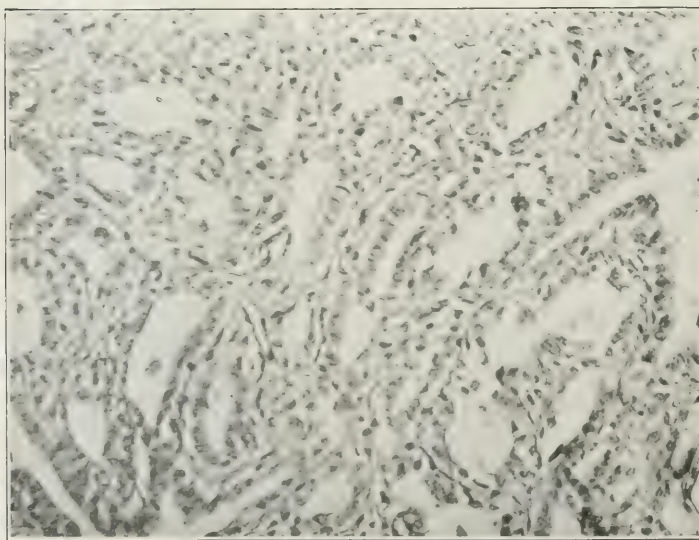


Fig. 2.

statement of the patient, in the last month before she came to the Out-Door Clinic. The inspection of the external genitalia showed a growth the size of a large pea slightly above the middle of the left labium minoris. It was covered with normal epidermis. It was rather firm, ill-defined towards the surrounding tissue, and was painless on touch. The tumor was removed under local anesthesia and sent to the

pathologic department for examination. (Pathological No. —18146.) The gross description corresponds to what has been mentioned above of the clinical presentation of the case. Sections showed that the solid neoplasm was composed of numerous

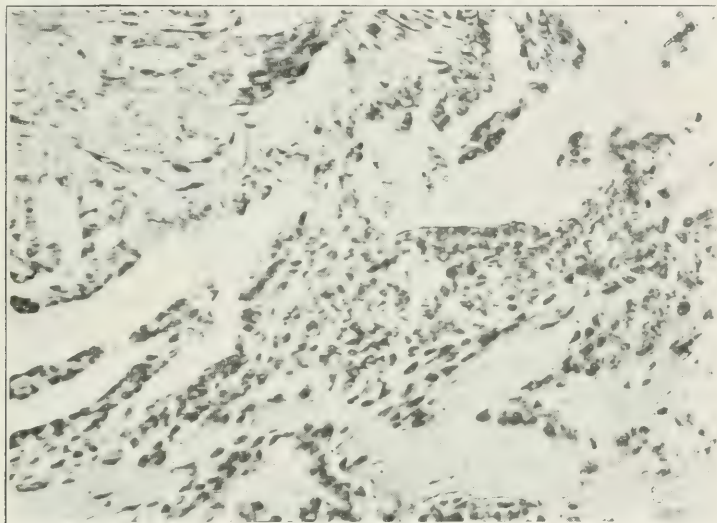


Fig. 3.

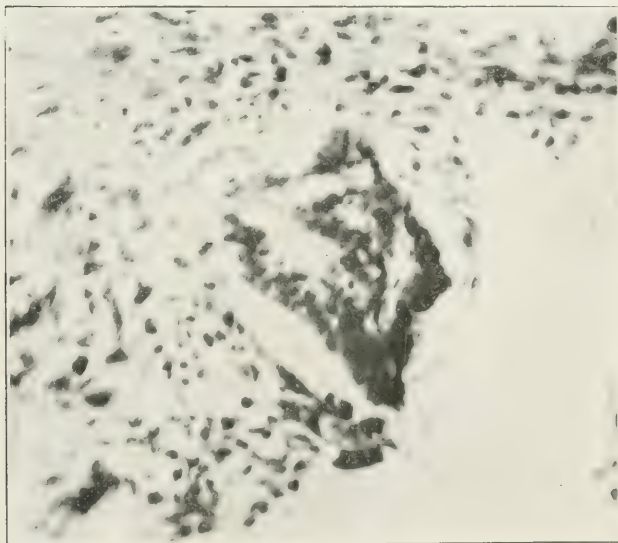


Fig. 4.

tubules with irregular and fairly large lumina (Fig. 1). There are also flat papillary structures which, however, appear to be caused by projections of the actively growing adenomatoid masses into the interstitial free spaces. The tubules are lined with a one or two layered high columnar epithelium with spindle-shaped nuclei. There are no cilia present. The nuclear stain is of varying intensity, mitoses are frequent,



but any definite characteristics of a rapidly growing epithelial tumor of a malignant character are not outspoken so far as the appearance of the individual cells are concerned (Fig. 2). But in certain portions of the sections one sees solid masses of cells of a rounded, polyhedral type penetrating into the stroma (Fig. 3). The question whether these cellular masses are the forerunners of new adenomatous structures cannot be safely decided upon. But it is very probable that such is the case since the amount of stroma in the adenomatous portions is very scant and shows rather signs of rarefaction by the epithelial tubules than spontaneous proliferation. It must be assumed that the cell masses which show increased mitotic activity have the tendency to spread solidly into the healthy tissue. The scant stroma between the tubular structures show thin strands of elastic fibers enveloping the tubules. Based upon these findings a diagnosis of an adenoma hidradenoides tubulare (Pick) with destructive tendencies was made. A secondary excision of the labium proved the presence of epithelial islands in the surroundings of the original site of the growth (Fig. 4). There were no actual adenoma tubules present. Glands or formations which could be interpreted as coil (sweat) glands or excretory ducts of the latter were not found.

Judging from the general histologic appearance the tumor must be called an adenoma destruens. The histogenesis of this type of growths, which is often cystic, was elucidated by L. Pick in 1904. He distinguishes two types of neoplasms resembling each other in many respects. One type, the hidradenoma, is a noninvasive growth with a membrana limitans. It shows connections with sudoriferous glands and in certain cases a sudoriferous duct originating in the adenoma is seen piercing the epidermis. The other type he calls adenoma hidradenoides because of their similarity to actual adenoma of the sweat glands (syringoadenomata). The direct proof of the derivation from sweat glands cannot be established with certainty in the latter type. Our tumor corresponds to what Pick designated as adenoma hidradenoides, inasmuch as we find no sudoriferous glands in the tissue. The tubular character of the growth signifies only its adenomatous type. There is, however, the rather extraordinary feature of invasiveness which was claimed by H. Ruge for a case of his. A comparison between our case and that of Ruge shows that this author's data, as well as the microscopic picture, are surely less convincing than those of our own observation.

The region of the body in which cystic or small solid tumors of the above described epithelial type are found permits much speculation as regards their histologic features. Sebaceous cysts with altered contents, hemorrhagic cysts containing grumous colloidal fluids derived from aberrant urethral ducts might be confused with them. A rather exact study of the literature on this subject made by Bluhm led this author to believe that they are real tumors and she calls one of them with a general pathologic term "polypoid glandular cystoma." Bondi who described eight cases of cysts of the labia, correctly thinks that ciliated epithelium indicates a cyst of embryonal origin. His case, No. 7, however, seems to correspond to a growth of Pick's

type. Weber and Pichevin in their case description, remark that cysts of the Wolffian duct show no papillation.

It is manifest from the study of these tumors of the labia that Pick's types can be separated from the embryonal, sebaceous, lymph and urethral (Skene's ducts!) cysts and that his classification meets the needs of our present knowledge of the tumors concerned. It is to be assumed that cysts are formed secondarily from secretions of the epithelial portions and therefore constitute only a morphologic change of these intrinsically epithelial neoplasms. Whenever we are able to prove the connection with sweat glands, excretory ducts of the latter, the elastic membrana limitans, the double-layered epithelium we shall properly derive them from sudoriferous glands. Where the exact proof of these characteristics is missing, we have to designate them as "hidradenoides" because of their marked similarity to hidradenomata. The invasive character, as is shown in our case, deserves special attention on account of its comparative rarity.

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## DETACHMENT OF ADHERENT PLACENTÆ AND DELIVERY IN ABORTION\*

BY C. E. RUTH, M.D., DES MOINES, IOWA

THE great frequency of abortion from whatever cause, together with its possible grave complications, gives the subject sufficient importance to justify its careful consideration.

Complete detachment of the placenta is, at times, difficult, in many cases it is imperfectly accomplished, and in others much needless trauma is done, besides increasing the danger of infection and sterility by the manipulation intended to detach and remove the secundines.

Were the index finger of sufficient length, it would be the ideal instrument with which to produce detachment of the placenta because its tactile sense makes it an ideal instrument of precision, which enables us to practically see and map out the condition. Unfortunately the longest finger is almost, but not quite long enough for the work, as I have abundantly verified in many cases.

Placental forceps now on the market are absolutely worthless for detaching the placenta and any ordinary forceps can remove a placenta which is already detached.

The impossibility of effecting detachment of the placenta by the finger in many cases, the uncertainty and danger of the auger and the curet, even in the most skilled hands has caused a large percentage of the profession to abandon all attempts at removal of the secundines in abortion cases with adherent placenta. These physicians allow the secundines to come away by putrefaction as safer than manipulation of any kind.

Not one physician in one thousand would seriously consider leaving the bedside of a patient for more than a few moments in a case of labor at term, until the placenta was delivered. The placenta has as certainly lost its function in the case of abortion, as in a case of labor at term. If allowed to remain after abortion, this is only an admission on the part of the surgeon that he cannot safely remove it. Failure to remove the placenta following labor at term would by most physicians be considered criminal.

The surgeon should, can, and usually does, prevent infection in wounds elsewhere; he should do equally clean work here and give his patient protection against infection by emptying the uterus at once and thus save her from the dangers of death, prolonged illness, permanently impaired health and sterility. I am convinced that the uterus

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can always be safely emptied if done promptly, before putrefactive changes have begun, accompanied by pyrexia, septicemia and abscess-formation.

The method presented to you herewith is not an untried procedure,

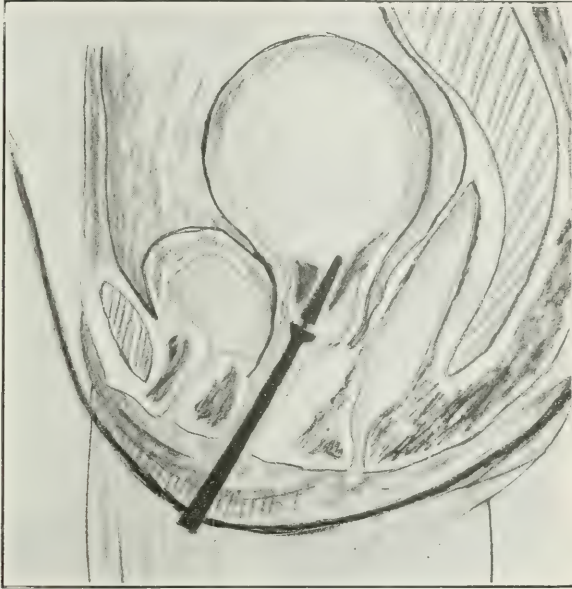


Fig. 1.—Hard rubber dilator on stem, inserted into cervical canal. The elastic bands, necessary to keep constant the small force needed to accomplish dilation with this method, are attached to the lower end of the stem below and to a binder or adhesive around the abdomen, above.

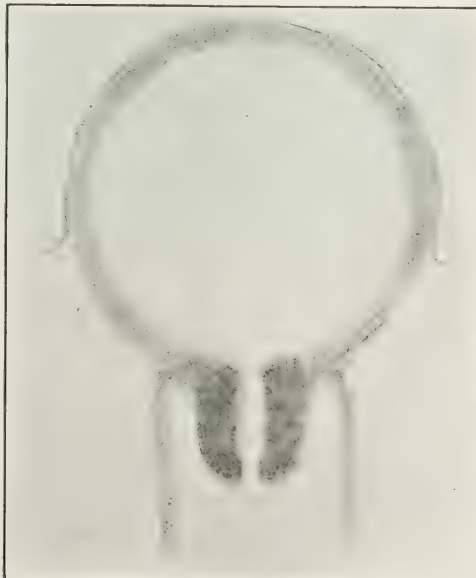


Fig. 2.—Diagrammatic sketch of uterus in early months of pregnancy, showing globular character.

but one I have used for thirty years. I have tested it to my entire satisfaction before asking consideration by the profession.

The body of the uterus in the early months of normal pregnancy, being almost perfectly spherical with the neck of from one to one and one-half inches in length, it follows that any appliance to be of service in detaching an adherent placenta, must be capable of application to every part of the interior of a spheroid. If such an instrument is to be of the forceps type, it must be capable of being made small enough to be introduced through a long cervical canal; it must be capable of

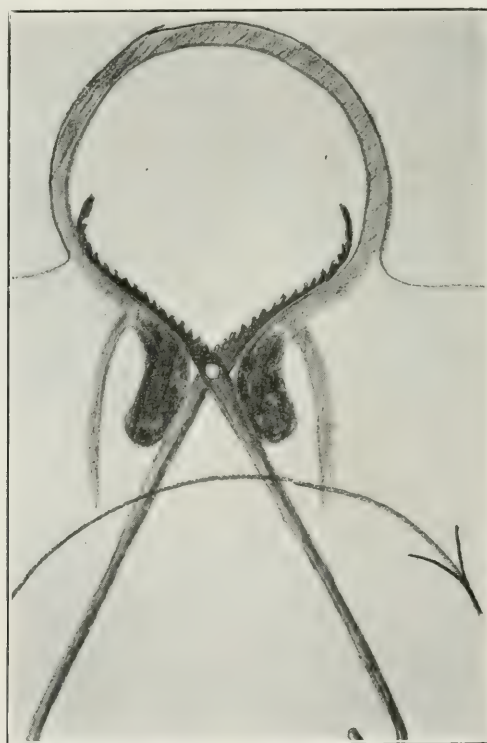


Fig. 3.—Detacher introduced, spread, and ready to sweep the lower segment.

expansion entirely above the narrow cervical canal; must be so constructed as to reach every portion of the interior of the uterus and clear it of detached placental tissues and membranes; and when that is done it should be capable of being closed and withdrawn, bringing with it the placenta and membranes in such a manner that no harm is done to the patient, and with a minimum of pain.

I have devised such an instrument in two sizes, and although I have used it for many years with satisfaction, I have never until within the last year attempted a published description of its virtues and uses.

The stage of gestation and the size of the uterine cavity, will deter-

mine the size of the instrument to be used in detaching the secundines in any individual case.

In some cases, even if abortion is inevitable, the cervix is not sufficiently dilated for instrumentation of the uterine contents. In such instances the use of the hard rubber dilator with elastic pressure will accomplish the dilation in a few hours, without trauma, without anesthesia, and without abrasion of the mucosa. Then, with or without anesthesia, the detacher is introduced under aseptic precautions with

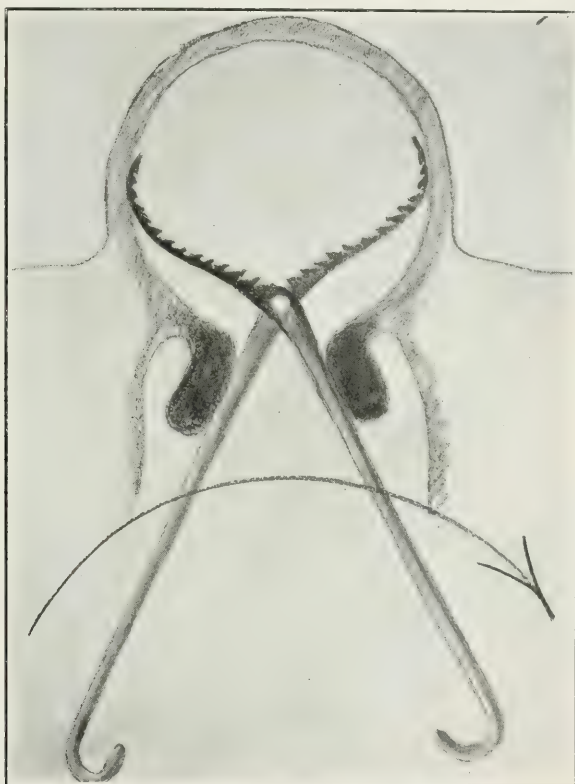


Fig. 4.—Detacher further introduced and sweeping the midportion of the uterine wall.

the jaws closed, while the fundus uteri is depressed and the handles of the detacher are carried backward, so as to bring the uterine and vaginal canals in a straight line as nearly as possible. The fundus uteri is steadied by the left hand above the pubes, while the right hand spreads the jaws of the detacher apart and holds them firmly in contact with the lower internal surface of the uterus. In this position the detacher is rotated and the lower segment is swept by a complete rotation. The detacher is then inserted an inch farther up and again rotated in the same direction; this is repeated until every part of the interior of the uterus has been cleansed. Then the jaws of the



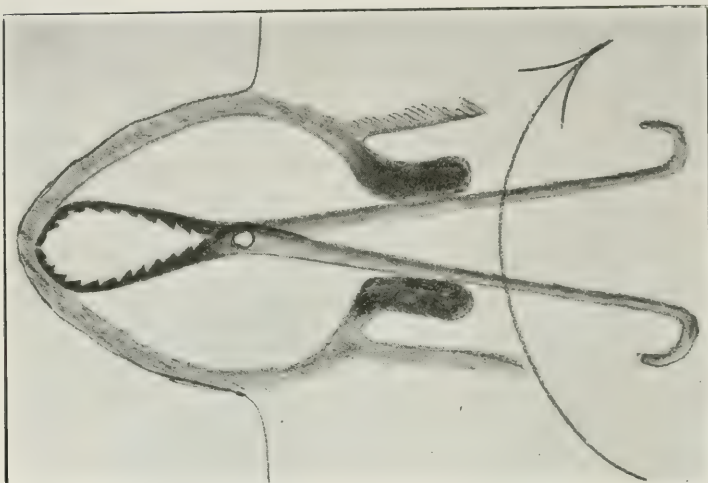


Fig. 6.—Last stage of the rotation completed, placenta and membranes caught in and surrounding the blades. The forceps are closed and ready to be withdrawn.

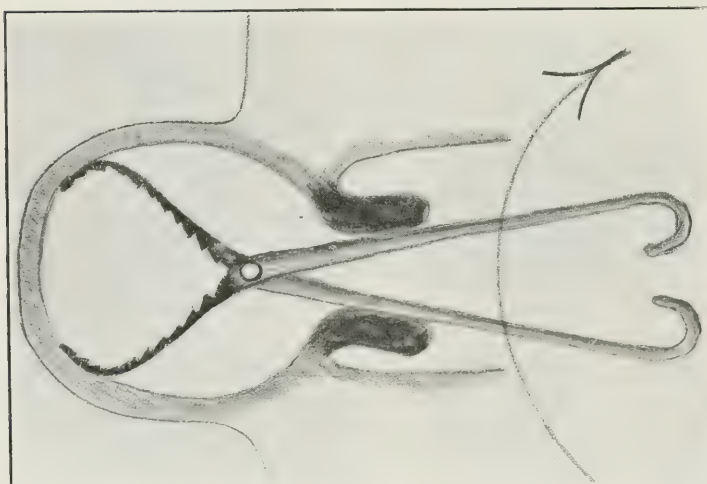


Fig. 5.—Complete introduction of the detach for sweeping the upper segment.

instrument are closed and instrument, placenta and secundines are gently withdrawn while the rotation is continued until all is delivered.

Proper care in the use of the instrument will usually result in a complete detachment and delivery of the placenta and membranes at the first trial.

There is however no objection to repeating the performance, if there is any doubt of the complete removal of the uterine contents.

Steadying of the fundus with one hand, while the instrument is rotated, produces very active uterine contractions and materially aids separation of the placenta.

The instrument was originally made to present a dull margin against the uterine wall while rotating to the right. When rotating to the left a sharp edge came in contact with the area from which the placenta and membranes were to be detached.

At the present I would never recommend the use of a sharp-edged or angled instrument in detaching the placenta. Great harm has resulted from the use of the sharp curet in these cases.

I have twice perforated the uterus with a curet and I have seen septic uteri through which the finger could be passed with very slight resistance encountered.

I am convinced that thousands of women have been rendered sterile by the curet with no compensating benefits. The auger principle of detachment is scarcely less dangerous than the curet and its main effect is, principally, to stimulate uterine contraction.

Thorough disinfection should accompany all instrumentation of the uterine cavity and be followed by tubal drainage in all septic cases.

## THE FEMALE PELVIC URETER\*

BY DAVID W. TOVEY, M.D., NEW YORK, N. Y.

**P**ALPATION of the pelvic ureter should be a part of every vaginal examination. There is nothing between the fingers and the ureters except the vaginal wall. They can be felt from the bladder to the pelvic brim. It is easy to teach students to palpate the ureters, after they have learned their position, by inserting ureteral catheters. The ureters are one inch apart in the trigone, about one inch behind the internal urethral opening, and two inches behind the external meatus. They are about two inches apart at their entrance into the bladder, where they run through the bladder wall for three-quarters of an inch. These points are about half an inch in front of the cervix on the anterior vaginal wall, and about an inch from the crossing of the ureter by the uterine artery.

After leaving the bladder the ureters curve over the anterior vaginal wall and lateral fornix, to a point half way between the lateral border of the cervix and the pelvic wall, where they are crossed by the uterine artery on a level with the internal os about an inch from the lateral border of the cervix and two inches from the ureteral openings. From the point of crossing, the uterine artery accompanies the ureter for one or two inches through the base of the broad ligament to a point on the pelvic wall just above the spine of the ischium, where it turns upward on the pelvic wall covered by peritoneum, sometimes in front and sometimes behind the internal iliac to the pelvic brim. The ureter leaves the pelvis through the infundibulopelvic ligament behind the ovarian artery. The right ureter is more often in front of the division of the common iliac, the left one behind it.

The ureters are often outlined on the anterior wall by the ureteral ridges. In 1880 Pawlick catheterized the ureters by using the ridges as landmarks.

The following directions will aid in palpating the ureter from the bladder to the base of the broad ligament. Imagine a line from a point, about half an inch in front of the cervix, to a point half-way between the lateral border of the cervix and the lateral pelvic wall. The point half an inch in front of the cervix where the ureter enters the bladder, varies with the position of the cervix. The point half-way between the lateral border of the cervix and the lateral pelvic wall, is where the uterine artery crosses the cervix and is fixed.

The vaginal fingers are introduced into the anterior lateral vault of

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the vagina. Counterpressure is made downward through the abdominal wall. Draw the fingers forward. As the tissues slip through the fingers, the ureter is palpated as a flattened cord-like body, smaller than a goose quill, displaced in its bed of loose cellular tissue, as it slips through the fingers.

It can be rolled from side to side under the palpating fingers, by moving the fingers toward the bladder, or toward the broad ligament. The ureter is felt from the bladder to the base of the broad ligament.

Posterior to the broad ligament it is felt just above the spine of the ischium, covered by the peritoneum, to the pelvic brim, by palpating it against the pelvic wall. It may run as high as an inch above the ischial spine. Judd advises sweeping the fingers above its location, bending the fingers as in picking a guitar. In the latter part of pregnancy the ureters do not follow the pelvic wall to the spines of the ischium, but after accompanying the internal iliac artery they pass beneath the broad ligament just below the pelvic brim.

In examining the ureter per rectum, insert the finger to the bifurcation of the iliac artery, which is located and traced downward, with the tip of the finger. Palpating behind at the side and in front of the artery, the ureter can be followed in its course until it passes under the broad ligament.

The normal ureter is never painful. If diseased, it is enlarged from the size of a goose quill to that of a lead pencil or larger. Tender pressure brings an intense desire to urinate, compared with its fellow, which is rarely as much enlarged unless both are diseased as in the pyelitis of pregnancy. The tuberculous ureter feels like a string of beans. Calculi, gravel, pyelitis, tuberculous kidney, gonorrhea, cervicitis, lacerations and infections from the cervix, cause ureteritis, periureteritis and stricture. Because of the nerve plexus of the abdominal sympathetic, pain is diffuse and symptoms are caused in the adjacent abdominal viscera, bladder, uterus, ovary, appendix, stomach, gall bladder, etc.

Bladder symptoms following hysterectomy, in which the cystoscope shows a normal bladder, are due to ureteritis and not to cystitis. Sanger, 1886, reported cases of ureteritis treated for long periods for cystitis. Judd reports a case of early pregnancy with ureteritis and spotting, mistaken for ectopic pregnancy. Hunner has reported a large number of strictures of the lower ureter, mistaken for all sorts of abdominal conditions. The Mayos report that most of the cases of kidney and ureteral stone coming to them, have been mistaken for other abdominal conditions and have had operations on stomach, gall bladder, ovary or appendix. Kelly and Burnham state that gonorrhea is a common cause of ureteritis and stricture.

Chronic pyelitis and ureteritis cause stricture of the ureter, and are followed by hydronephrosis if not promptly and properly treated.

Ureteritis, due to lacerations and infections of the cervix, if treated early, will not result in stricture.

CASES TREATED FOR VARYING ABDOMINAL CONDITIONS MADE CLEAR BY  
PALPATION OF THE PELVIC URETER

CASE 1.—R. J., thirty-five years. Since birth of child, five years ago, pain in left side of abdomen and back, very severe at times. Frequent painful urination. Was advised to have ovary removed and was treated for constipation, cystitis, ulcer of stomach, etc. Examination: Pelvic organs normal; cervix lacerated, eroded and infected; left ureter enlarged and very tender; palpation creates intense desire to urinate. Collargol injection showed ureter slightly dilated just over the bladder; kidney pelvis slightly dilated. Pain relieved after ureteral catheterization.

CASE 2.—A. G., sixty years. Patient sent to New York Polyclinic by Dr. Wells. Acute pain over gall bladder; right abdomen tender and rigid; half a grain of morphia gave only partial relief. Examination: Right ureter enlarged, tender and very sensitive; small stone felt just above bladder. Right ureteral meatus, red and swollen; catheter obstructed .2 cm. above bladder. Collargol injection showed small stone in pelvic ureter with ureter dilated above it. Kidney pelvis moderately dilated. Patient relieved immediately after examination. Four days later she passed a stone the size of shoe button.

CASE 3.—G., thirty years. Single. Pain in right abdomen; indigestion. Sent to have appendix removed. Examination: Pelvic organs normal. Right ureter thickened, tender, pressure creates desire to urinate. Collargol injection showed stricture just above bladder; ureter dilated above it; small hydronephrosis. Cured by dilatation of ureter.

CASE 4.—R. S., twenty-two years. Married four years; one child three years old; three miscarriages brought on by midwife; operation two years ago for gallstones; a year later operation for adhesions of gall bladder; complains of pain in right abdomen; backache worse on walking; frequent urination; profuse leucorrhea. Examination: Right ureter enlarged and tender; palpation creates desire to pass urine; cervix eroded and infected. Collargol injection. Ureter slightly dilated above bladder. Treatment to cervix and vault of vagina brought relief.

CASE 5.—Patient thirty-two years old; one child aged five; last menses three months ago; severe pain in right ovarian region, accompanied by spotting. Sent to Polyclinic Hospital to be operated upon for ectopic gestation. Examination: Pregnant three months; right ureter enlarged, very tender; pressure creates desire to pass urine. Treatment to vault of vagina; urotropin, and lavage of kidney pelvis brought relief.

CASE 6.—K., forty years. Fever; chills; tumor in right abdomen, diagnosed to be gall bladder and ovarian cyst by different men. Frequent urination; blood clots in urine, at times, which were accounted for, by the physicians, as result of inflamed urethral meatus. Examination: Right ureter much enlarged and tender; bladder normal; right ureteral meatus reddened and contracted. Collargol injection. Soft stone in kidney pelvis, size of plum, which did not show in x-ray. Large pus kidney with very soft stone removed.

CASE 7.—I. R., twenty-five years. Married three years; pain right side of abdomen made worse by walking; indigestion; constipation; appendix removed without relief. Was advised to have ovary removed. Examination: Right ureter enlarged, very tender on palpation, which creates intense desire to pass urine; small hard mass,

believed to be a stone, felt at entrance of ureter into bladder. Cystoscope showed small reddish brown stone sticking out of ureteral meatus. X-ray showed stone half inch long at entrance to bladder. A few days later the x-ray examination showed stone two inches higher up in ureter. At first examination it was impossible to dislodge stone. Ureter dilated and stone passed.

CASE 8.—M. K., thirty-seven years. Operated on, two years ago, for left tubo-ovarian abscess. For past year pain in left kidney and abdomen; frequent urination, every half hour at night; pain very severe of late. Examination: Uterus slightly fixed; left ureter thickened and tender; palpation brings on intense desire to urinate left kidney region painful; cystoscope shows left meatus contracted and retracted; catheter obstructed 6 cm. from bladder; ureteral meatus contracts, but no urine passes. Operation: A small hydronephrotic kidney removed; lined by thickened membrane.

CASE 9.—J. M., thirty-five years. Since birth of last child, three years ago, indigestion, pain over right kidney, and over right abdomen; urination frequent and painful, at times. Has been treated for cystitis and was advised to have appendix removed. Pain in ovarian region during menstruation. Examination: Pelvis normal; right ureter enlarged, tender and palpation creates intense desire to urinate; cervix lacerated, eroded and infected; cystoscope reveals normal bladder. Collargol injection shows ureter dilated 3 inches above bladder. Treatment to cervix and vault of vagina gave relief.

240 RIVERSIDE DRIVE.



## PATHOLOGIC LEUCORRHEA AND ITS TREATMENT\*

BY FRANCIS REDER, M.D., ST. LOUIS, MO.

**I**T IS somewhat unfortunate that the vulva presents an anatomical conformation which makes it not only difficult to cleanse, but also to maintain a proper state of cleanliness. Many of the discharges caused by inflammatory conditions of the genital mucous surfaces in children and in young girls are due entirely to a want of cleanliness, to a collection of the natural secretion in the parts and its subsequent decomposition.

A discharge escaping from the female genital fissure, if not hemorrhagic, can be conveniently termed a leucorrhea. This appellation is the customary one so long as the character of the discharge, and the various states upon which the discharge depends, have not been determined. When the true source has been revealed it becomes incumbent upon us to speak of the lesion causing the discharge, rather than calling the condition "a leucorrhea."

The term leucorrhea groups together a large number of disorders of the uterovaginal canal which, in a symptomatic manner, give definite expression to the character of the lesion and its possible anatomic location.

A leucorrhea, however, must not be interpreted too liberally as being the symptom of some morbid condition of the female genital tract, for there are other conditions, the very opposite to inflammatory lesions, which may be responsible for a leucorrheal discharge. In connection with such leucorrhœas, it may be said that the principal disorders of menstruation, including amenorrhea, dysmenorrhea, menorrhagia, vicarious menstruation, and the catamenial climacteric, all have important relations to vaginal discharges.

A leucorrhea of an annoying nature, not dependent upon any morbid state, may precede and succeed a normal menstrual function in a healthy young woman. It may establish itself during the earlier period of married life, or it may become apparent during the pregnant state, and also during the period of lactation. These leucorrheal discharges manifest themselves in healthy women irrespective of age.

In children and infants in particular, leucorrhœas are not infrequent. They consist almost entirely of a discharge from the glands of the vulva, these parts being more developed in a child than the rest of the sexual organs. In these instances constipation, ascarides, and neglect of cleanliness are the most common causes.

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

During the period of dentition a mucous or mucopurulent secretion may not infrequently show itself; and it is not unusual to find children suffering from an eruptive disease presenting a leucorrhœa. Although such a discharge may become intractable, it cannot be classed as chronic. Its tendency is to be intermittent, and as long as the bacterial contamination is kept in abeyance by the protective microorganisms of the vaginal canal, such a discharge must be looked upon as a physiologic reaction. The treatment is simple and seldom requires anything more than the rigid enforcement of hygienic measures.

Neither can a leucorrhœa, allied with constitutional tendencies to ill health, be considered in the light of a pathologic discharge. It is rather the type of a subgroup of a physiologic hypersecretion, expressive of the constitutional disorder itself. Usually with the cure or the amelioration of the constitutional disorder, the discharge will improve and often disappear.

An excessive excretion from the hypertrophied uterine mucosa, caused by the presence of a fibroid tumor or a polypoid growth, will be designated as a leucorrhœa as long as its origin remains obscure. These discharges are the expression of a morbid physiology and cannot be justly classed as pathologic.

It will always remain a somewhat difficult undertaking to properly classify leucorrhœa. A physiologic leucorrhœa may retain its characteristics as long as the vaginal defenses are sufficiently strong to cope with an extraneous microbic invasion. The resisting power of these structural defenses has its limitations and unless aid is rendered before they are exhausted, the condition must eventually drift into a chronic state.

Can this chronic state be looked upon as pathologic? The answer must be in the affirmative, inasmuch as it has been demonstrated microscopically that marked structural changes have been excited in the tissues of the uterovaginal tract which have caused the innocent character of the discharge to assume the characteristics of the contaminating bacteria.

A leucorrhœa of this type, when of recent origin, is either of the exaggerated mucous variety, consisting chiefly of mucous corpuscles and plasma, secreted chiefly in the follicular canal of the cervix, or it is of the epithelial variety, in which the discharge is secreted by the vaginal portion of the os and cervix and is freely mixed with scaly epithelium and its debris. These two varieties may, of course, exist in various degrees of combination; sometimes the one and sometimes the other preponderates, or is the original affection, but the chief importance must be given to cervical or mucous leucorrhœa as being the most obstinate and common.

In the severe cases these discharges are bacterially contaminated and become mucopurulent in character. The irritative action of the

discharge leads to pathologic changes in the vaginal walls and cervix, thereby increasing the severity of the symptoms and the difficulty of cure.

The most frequent structural changes observed in the vaginal type of leucorrhea are those of desquamation. The villi become affected and not only is epithelium separated with extraordinary rapidity, but pus is formed upon the irritable subepithelial or villous surface. Occasionally epithelium is thrown off in large shreds, in which the pavement-like arrangement of the scales is perfectly preserved.

In cervical leucorrhea the pathologic changes occurring in the os uteri, the external portion of the cervix uteri and the lower portion of the cervical canal are, usually, more pronounced than those of the vaginal canal, presumably because the structures are more inviting for the propagation of the bacterial flora. The lining of the cervical canal is a true mucous membrane. It is covered in great part by cylinder epithelium and abounds in immense numbers of mucous follicles having a special arrangement. It excretes a true mucous secretion, alkaline in character, consisting of mucus corpuscles and plasma mixed with little or no epithelium. Note, if you please, the difference from the lining membrane of the vagina which approaches in organization the skin. This membrane is covered by a thick layer of scaly epithelium, containing in the greater part of its surface few, if any, mucous follicles or glands; its secretion is acid, consisting chiefly of plasma mixed with epithelium.

Frequently diseased conditions of the lower segment of the uterus are secondary affections the result of a leucorrhea. Under such conditions the os and cervix uteri may present a vascular injection, an epithelial abrasion, a superficial ulceration, or an induration and hypertrophy with erosions. It is not uncommon to find associated with these lesions, abrasions and superficial ulcerations of the upper portion of the vagina. A type of chronic leucorrhea having its origin in cervical affections in which the leucorrhea is considered a subordinate symptom, is birth laceration.

A bruised, ecchymotic and lacerated cervix furnishes a most inviting and fertile field for microbial activity. Although the condition may exist for a long time without attracting attention, secondary pathologic changes such as erosions, granular inflammation of the cervix, cystic degeneration, extensive hyperplasia with ectopic lips, will sooner or later give evidence by a profuse and persistent mucopurulent or purulent discharge that a lesion exists.

A type of leucorrhea which has received well deserved attention on account of its chronicity and its great obstinacy to treatment is the gonorrheal type. This infection conforming to the different intensity of the poison, the susceptibility of the patient and the neglect or care with which the affection has been treated, can be far reaching and very



disastrous in its virulent action. It is a true pathologic leucorrhea. Although the vagina most commonly harbors a gonorrheal infection, the gonococcus from physiologic causes may readily be carried to the lower extremity of the uterus and there find vastly more suitable quarters for dwelling and propagating. Particularly is this true where catarrhal conditions of the mucous membrane or old birth traumas of the cervix have rendered these structures more susceptible to specific inoculation.

The vagina possesses a normal secretion contributed by a great variety of saprophytic microbes, both bacilli and cocci. The properties of these bacteria are capable, to a certain extent, of materially modifying the virulency of the gonorrheal poison and eventually cause the coccus to disappear from its folds. In the secretion from the mucous membrane of the cervix these fortunate properties are lacking. Thus long after the gonorrheal poison has lost its virulency in the lower vaginal canal, the os and cervical canal will continue to be the field for gonococcus activity.

The urethral orifice, very much like the cervical canal, is also afforded a protection in a much less perfect degree and is, therefore, highly susceptible to the action of specific inoculation. While in the course of time a gonorrheal infection, involving the urethral orifice and the vaginal walls, may disappear, the diseased condition about the os and cervix uteri seldom shows any signs of abatement. Changes, however, may take place in the character of the discharge and cause it to resemble the secretions found in a nonspecific cervical leucorrhea.

The continuance of the discharge from an infected cervical canal must be ascribed to the activities of the gonococci deeply imbedded in the compound racemose glands. It must be borne in mind that the mucosa of the uterus is intimately connected with the underlying muscularis, there being no submucosa, and that these compound ducts or laminae and nabothian glands penetrate deeply into the surrounding fibromuscular stroma. Thus it can be readily understood how well a gonococcus can ambush himself and remain defiant for a long time.

In considering the treatment of a leucorrhea the underlying principle must be the arrest of the discharge, the removal of the local disorder upon which the discharge depends, and the relief of any constitutional disorder with which the leucorrhea may be connected, either as cause or effect.

Undue prominence should not be given to either constitutional or local treatment. In some instances constitutional measures will alone arrest the discharge, while in other cases a local treatment will be sufficient without the adoption of general measures. The great majority of cases require both local and constitutional measures to insure a

permanent cure. If we depend upon local or constitutional treatment alone, the discharge, after an apparent cure, is prone to recur.

It should not be overlooked that gross pelvic pathologic conditions and the lesions of the cervix, incident to childbirth, should receive the proper surgical care, otherwise the efforts to rid the patient of her discharge may prove useless. Even a lacerated perineum must be given consideration. It may be responsible for certain degrees of vaginal and uterine prolapse and should be repaired before a successful coping with the discharge can be expected.

Leucorrhœas of specific origin will remain obstinate unless the constitutional taint of syphilis is removed, necessitating of course a special treatment.

In leucorrhœas the result of gonorrheal infection, one of the most frequent and most obstinate maladies of the present day, many of the fondest hopes have been shattered upon the rock of sapiens. Time is perhaps our most favored ally, as it is a very tedious undertaking to destroy the virulency of a Neisserian gonococcus.

Inasmuch as a chronic leucorrhœa has its favored abode in the mucosa of the cervical canal, creating a local pathology known as chronic endocervicitis, the treatment of necessity must be directed to this part of the uterine body. Cleanliness is the prime requisite. However, it must be stated that cleanliness such as it is usually carried out by the patient in the way of douches is of little avail. In fact ordinary douching, so frequently advocated in vaginal discharges, will do no good in a pathologic leucorrhœa and had better be discontinued.

The first step in the treatment of a pathologic leucorrhœa, or for that matter any type of leucorrhœa, is a thorough cleansing of the vagina and cervix with liquid soap and warm water to be followed with an ablution of an alkaline solution. The canal of the cervix must be freed of its mucous deposits and cleansed in a like manner. If the os is very small or narrowed by an acquired stenosis, thereby hindering the cleansing, it is to be gently dilated to obtain proper accessibility. Should lesions be present, the result of birth trauma or the sequelæ of leucorrhœal irritation, their treatment must receive precedence over the treatment of the discharge. Some of these lesions such as cervical erosions and ulcerations often heal following an application of solid nitrate of silver, pure carbolic acid, or a mixture of thymoliodide, 10 per cent in cod liver oil. Other lesions, such as hypertrophy and hyperplasia with ectropion of the cervix showing granular inflammation of its exposed mucous membrane, demand either a tracheloplasty, a trachelorrhaphy or in the more severe cases an amputation of the cervix. Furthermore vaginal crevices, vulvar pockets and the periurethral ducts must be thoroughly exposed, usually by incision. These recesses are favorite haunts for the gonococcus. All operative measures must be governed by the conditions as they are interpreted

by the attending gynecologist. They may prove successful and they may result in failure.

In those conditions where the vaginal walls have suffered a loss of tone from the destructive potency of the discharges with a tendency to relaxation bordering on prolapse, a hard rubber ring pessary or a Gehrung pessary should be introduced to prevent attrition of the vaginal walls. An important requisite in the successful management of a chronic leucorrhea is the gentle tamponade of the whole vaginal canal, not with an ordinary tampon, but with soft fluffy gauze. A good tampon can be obtained by taking a gauze bandage  $1\frac{1}{2}$  inches in width and boiling it until all starchy matter has been removed. It is then allowed to dry. This makes an ideal gauze for packing. As long as the patient is under the direct care of the gynecologist any douching or irrigating by the patient should be prohibited.

After recovery from a plastic operation on the cervix uteri, the discharge may cease or it may be reduced. It is usually the case, however, that it continues unabated. This can often be ascribed to a mixed infection. The discharge under such conditions is one closely allied to a leucorrhea without any visible lesion, and a local treatment is most helpful and promises much. The sole object of the treatment is to reestablish as speedily as possible the impaired tissue defenses of the affected structures. No time limit can be placed on a local treatment. It may bring an appreciable change in three months and it may require twelve months before any result is obtained.

The application of the methylene-glycerin solution as practiced by R. Stafford Foss, of London, has given very satisfactory results in my hands. A strip of gauze is saturated with the solution, packing it into the cervical canal, about the cervix and the upper portion of the vagina, and allowing it to remain for 24 hours. It is then removed and a fresh packing introduced. This procedure is continued for five days. A dry packing is then substituted for two following days. The treatment is continued as long as the discharge persists. Another treatment of merit with a technic similar to the methylene-glycerine solution, is a 5 per cent picric acid solution in 25 per cent alcohol. A tampon saturated with this solution is allowed to remain for eight hours. The gauze is then withdrawn and a dry packing introduced. Bisulphate of quinine in solution of 40 grains to the ounce of water, applied in a similar manner as the methylene-glycerine solution, has given very good results.

A treatment most ably worked out by Drs. Frank B. Bloek and Thos. H. Llewellyn of Philadelphia, and well worthy of trial is the acidulation of the vaginal canal with lactic acid bacilli. It consists in introducing a readily soluble lactic acid tablet against the cervix. No tampons are applied. No douching is permitted. The patient returns in a week and the same technic is repeated. This weekly implantation



of the bacilli is continued until the vagina shows an acid reaction. In favorable cases this acid state is obtained in 3 to 4 weeks. After the reaction has become acid, no treatment is given as long as it remains so. Reimplantation may become necessary at the end of four weeks. The authors state that the treatment is seldom a permanent cure but a good palliative measure requiring attention but once a month and superseding douches. The treatment, it must be said, is highly successful in senile vaginitis with its irritating discharge and almost intolerant pruritus.

Dr. Douglas H. Stewart, of New York, has suggested a treatment which in certain types of leucorrhea has proved very satisfactory. It consists in the application of a powder composed of sublimine, gr. 2, sodium citrate, gr. 40, alum, drams 3, sodium chloride, one-half ounce, lead acetate, drams 6, and sugar, q. s., 16 ounces. With this mixture the cervix and fornices are covered and a tampon introduced. An application is made about three times a week. Before the reapplication of the powder the vagina is douched with 36 per cent acetic acid solution.

In concluding, mention must be made of the excellent work of Dr. Arthur H. Curtis, of Chicago, in the treatment of chronic leucorrhea with radium. It has been Dr. Curtis' experience that the radium treatment has been successful where other measures have failed. The treatment is still in its experimental stage and the great danger of inhibiting the menstrual function has been its serious drawback. If this menace can be eliminated, radium undoubtedly will prove to be a most valued curative agent for chronic leucorrhea.

UNIVERSITY CLUB BUILDING.

(For discussion, see p. 741.)

## GYNECOLOGIC BACKACHE\*

BY E. A. BULLARD, M.D., F.A.C.S., NEW YORK, N. Y.

*From the Clinic of the Woman's Hospital*

A MOST interesting and instructive treatise might be written about backache in women, were this symptom exhaustively studied from every viewpoint. Probably the longest chapter should be written by the orthopedist, but the gynecologist, neurologist and internist could contribute essays of considerable length and so interdependent should these be that the authors would do well to consult each other freely in the preparation of their respective monographs.

Some surprising observations made in the postoperative Follow-Up Clinic at the Woman's Hospital during the past few years led me to prepare this analytical study of backache.

There is a justifiable skepticism about statistics. Contentions of every sort have been backed up by statistics at one time or another, but I am not trying to prove anything. I wish merely to lay before you what the records show. While there is, of course, a certain percentage of error in these reports I believe that the rather thorough methods now in operation at the Woman's Hospital produce approximately accurate figures of the work.

Seven hundred twenty-one cases of backache, with sufficient data for satisfactory study, were taken up in order from the records of the Follow-Up Clinic since 1915 and tabulated for this analysis, as follows:

	CASES
Group I. Retroversion Uncomplicated by any other gynecologic abnormality	129
Backache cured by operation	103
Gilliam Operation	34
Bissell        "	16
Simpson      "	14
Internal Alexander	13
Grad	13
Miscellaneous Operations	13
Backache Unrelieved by operation	26
These were anatomically successful and nothing remained to explain the failure.	
	CASES
Simpson Operation	4
Gilliam        "	4
Bissell        "	4
Ventral Suspension	2
Round Ligament Plication	8
Miscellaneous	4

\*Read at the November, 1919, Meeting of the N. Y. Obstetrical Society; also read at Buffalo Academy of Medicine, May 19, 1920.

This is a series in which the backache might reasonably have been ascribed to the displaced uterus, but end results virtually proved that 20 per cent of these backaches were not from that cause and were almost certainly not gynecologic.

	CASES
Group II. Retroversion with Adnexal Inflammation	68
Backache cured by operation	59
Backache unrelieved by operation	9
Anatomically satisfactory retroversion operation with salpingectomy and no tenderness or induration remaining to account for the continuation of the pain.	

Here we found that elimination of the pressure of an adherent uterus or a tuboovarian mass, or relieving the drag of adhesions, seemed to cure 87 per cent of the backaches, leaving 13 per cent probably not pelvic, but undiagnosed.

	CASES
Group III. Adnexal Inflammation Only	19
The results here seem to justify the opinion that salpingitis with adhesions produces backache, for all but 2 of this group were cured by ablation of inflamed tubes—and sometimes the ovaries—and the release of adhesions. About 90 per cent cured.	

	CASES
Group IV. Uterine Prolapse (of various degrees)	84
Backache cured by operation	75
Various Ligament Operations for First Degree Prolapse	23
Watkins Operation	20
Mayo “	14
Bissell Trisection Uterus	3
Abdominal Hysterectomy	3
Vaginal Hysterectomy with Bissell Cystocele Operation	3
Miscellaneous Operation	9
Backache unrelieved by operation	9
Operation anatomically satisfactory and no pelvic lesions found to explain continued pain.	

	CASES
Goffe Operation	2
Baldwin “	1
Watkins “	1
Bissell Trisection Uterus	1
Mayo Operation	1
Vaginal Plastic Operations with Round Ligament Operation	3

In this important series we found 89 per cent of the cases relieved by operation, the backaches probably having been due to the drag on pelvic supports and therefore cured by successful anatomic repairs.



	CASES
Group V. Plastic Cases Only	46
Uncomplicated Rectocele	9
Cures	5
Failures	4
In spite of successful plastic operation	
Cystocele and Rectocele (without prolapse)	12
Backache cured	6
Backache unrelieved despite satisfactory anatomic repairs	6
Repairs of Cervix and Perineum	17
Backache cured	15
Backache unrelieved though the plastic operations were well done	2
Cervix Operations	8
For cystic, eroded, lacerated, hypertrophied cervix or chronic endocervicitis	
Backache cured in every case	

This group of plastic cases is too small from which to draw conclusions but I give you the figures.

	CASES
Group VI. Uncomplicated Retroversion with Lacerations of Perineum or Cervix	23
Backache cured in every case	
Gilliam Operation and Perineorrhaphy	12
A Round Ligament Operation of one or another type with repair of cervix and pelvic floor	11
Group VII. Uncomplicated Ovarian Cyst	7
Backache Cured by Operation	5
Backache Unrelieved by Operation	2
Group VIII. Fibromyomata Uteri	38
(Without adnexal inflammation, adhesions, or other complication.)	
Backache Cured by Hysterectomy	33
Backache Unrelieved by Hysterectomy	5
Group IX. Complex Cases	307
<p>This title is used for lack of a better one. The cases all have a combination of lesions. The classification is most unscientific, but in every case there were two or more conditions present each of which was capable of producing a backache. Obviously conclusions drawn from the study of such a series would be of doubtful value. An example of the type of case included in this class would be as follows: a repair of cervix, cystocele, and pelvic floor combined with operation for retroversion operation and adnexal lesions. To determine the cause or cure of such a woman's backache would be a hard problem. Usually, that is in 85 per cent of this class, the backache was gynecologic, for the operative procedures were successful in its relief.</p>	

	CASES
Backache Cured by Operations	260
Backache Unrelieved by Operations	47

Though you have been deluged by figures and percentages, one fact has surely been apparent all through this analysis, namely that there were *a number of cases in every group whose operative results were anatomically excellent and in whom no gynecologic abnormality remained to account for the unrelieved backache.* These cases may be summarized as follows:

- 20 per cent of the uncomplicated retroversion cases.
- 14 per cent of the uncomplicated fibroids.
- 13 per cent of the retroversions with adnexal inflammation.
- 10 per cent of the adnexal inflammations.
- 10 per cent of the prolapse cases.
- 15 per cent of the large complex group.

Obviously, at least 15 per cent of the cases of backache that we see in the Woman's Hospital are *not* gynecologic.

Ever since the beginning of the writer's attendance in out-patient gynecologic clinics, he has been impressed by the frequency of the symptom, backache. Stimulated by the writings of Bradford and Lovett, Dickinson and Truslow, and others, I became more interested in this symptom and acquired the habit of referring many patients with obscure backache to clinics in internal medicine, orthopedics and neurology for further investigation. Most often it was the orthopedist who cleared up the diagnosis and the frequency of such conditions as sacro-iliac joint trouble, lumbar myositis, arthritis of lumbar spine, disturbed muscle balance, flat feet, spinal curvatures, faulty attitude, etc., was interesting and very instructive.

Dr. George Gray Ward, Jr., Chief Surgeon of the Woman's Hospital, holds a similar opinion concerning the frequency with which gynecologic and orthopedic causes co-exist in the production of female backache, and has established an Orthopedic-Gynecologic Clinic at that hospital largely for diagnosis.

As I meditated on my series of cases it occurred to me that it might also be of considerable interest to gather up and classify those cases having the more common gynecologic causes of backache present, but which I had discarded as I went along because none of them had ever had a backache.

	CASES
Series 1. Adherent Retroversion with Inflamed Adnexa	47
Series 2. Uncomplicated Mobile Retroversion	20
Series 3. Prolapse of Various Degrees	20
Series 4. Procidencia	9
Series 5. Complex Cases (with several gynecologic conditions in each case capable of producing backache)	29

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Total 125

## CONCLUSIONS

1. In a series of 721 cases of backache studied at the Woman's Hospital 85 per cent were cured by an appropriate operation.
2. About 15 per cent of this series having one or more common gynecologic causes of backache present were not relieved of the backache by anatomically satisfactory operations.
3. Probably much more than 15 per cent of female backache is not gynecologic.
4. My series suggests that perhaps 15 per cent or 20 per cent of all women with retroversion, prolapse, pelvic inflammations, obstetric lacerations, or pelvic tumors do not have backache.
5. Closer cooperation with the orthopedist, the internist and the neurologist should enable gynecologists to better diagnose and better treat backache in women.

47 EAST FIFTY-SEVENTH STREET.

## A SIMPLE AND PRACTICAL APPLIANCE FOR ASEPTIC VAGINAL MANIPULATIONS

BY ORTA EDWARD KUHN, M.D., BERKELEY, CAL.

THE practical device described and illustrated herewith has been constructed after many laboratory and clinical experiments. The object of the instrument is to provide a practical aseptic passageway through the vagina to the uterus during manual examinations by eliminating from the field, the vulva and vagina which, it is admitted, cannot be thoroughly disinfected. This fact has been known since the time when Semmelweis and Holmes demonstrated that puerperal infection was conveyed almost always from without as the result of vaginal manipulations. Such examinations during parturition are therefore always charged with evil possibilities even when done with the most careful precautions. Williams and others have called attention to these facts in their text-books. Vaginal examinations and manipulations are by far the most important elements in the maintenance of high puerperal morbidity and mortality and it has been conclusively demonstrated that the liability is in direct proportion to the frequency of vaginal examinations and is markedly increased by manipulative procedures.

The instrument which I have developed consists of two parts: a glass tube (Fig. 1) and a thin rubber tube attached to a rubber shield (Fig. 4). The instrument is assembled as shown in Fig. 2, then enclosed in a glassine sealed envelope and sterilized by hot air. (Fig. 3.) In preparing to use the device the envelope is opened and the glass tube taken hold of with the right hand. The labia are then spread



apart with the thumb and index finger of the left hand and the shield placed against the vulva so that its opening is at the external orifice of the vagina. The elastic band is then rolled off the end of the rubber tube with the index finger of the right hand after which the glass tube is pushed gently into the vagina until the rubber tube is entirely everted out of the glass tube. This is shown when the marking of the latter is on a level with the opening in the shield. The glass tube is



Fig. 1.—Shows the glass tube with the oblong opening *A* and the oval opening *B*.

then gently withdrawn by rotating it slightly from right to left. This leaves the thin rubber tube in the vagina. Digital examination of the cervix may then be carried out without contamination from the outside. Attention is called to the fact that the longitudinal threads in the thin rubber tube absolutely prohibit the longitudinal stretching of the rubber, and as a result while the glass tube is pushed up into the vagina the rubber tube adjusts itself in a stable position with that level of the vagina with which it first came into contact. This avoids

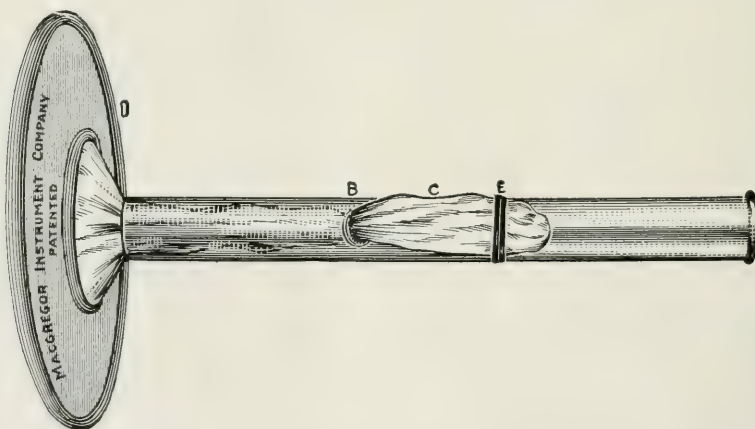


Fig. 2.—Instrument assembled and ready for use. The thin rubber tube *C* is drawn through the openings *A* and *B* and held in place by the elastic band *E*.

transferring any infectious material inward from the vulva and vagina up to the uterus. The oblong opening *A* in the end of the glass tube holds the walls of the everted rubber tube *C* in close approximation so that nothing comes in contact with any portion or level of the rubber tube except from that corresponding level of the vaginal canal which the rubber tube first touched. For all manipulations other than examinations, the distal end of the rubber tube *C* is open, thus allowing easy access to the uterus.

The advantages of the instrument may be briefly summed up as fol-

lows: (1) It provides a simple practical way of packing off the infectious vulva and vagina and affords an aseptic passageway from the exterior of the body through the vagina to the uterus. (2) All necessary vaginal examinations and manipulations may be made with indifference and safety as regards infection of the birth canal. (3) With the employment of this instrument the genital canal is not contam-

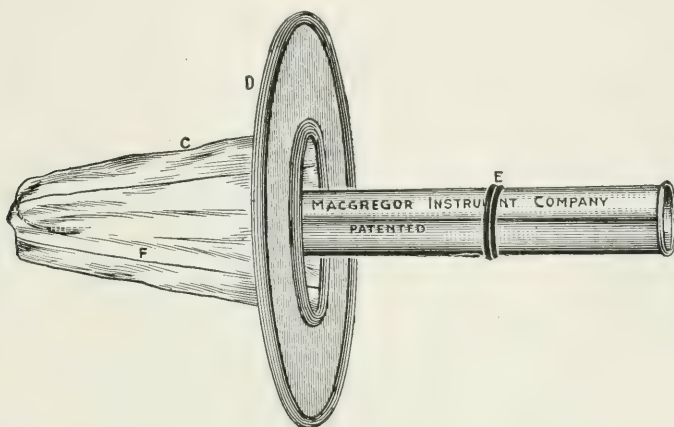


Fig. 3.—Shows the instrument in use, the band *E* having been rolled off the end of tube *C* and the glass tube partly pushed through the opening in the shield *D*.

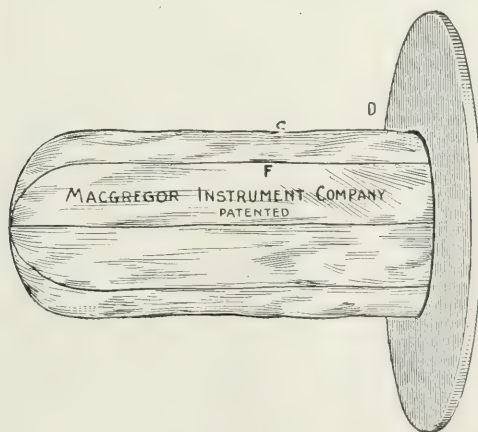


Fig. 4.—Shows tube *C* with embedded silk threads *F* after having been pushed through the opening in the shield *D* and out of the oblong opening *A* of the glass tube, the latter being then withdrawn.

inated by the examining finger. (4) The device is simply, easily and quickly applied. (5) No gloves are needed for examinations. (6) If the rubber tube and shield are cleaned, dried and powdered after using, the instrument may be reassembled, sterilized by hot air at a temperature not over 120° C., for half an hour and thus used an indefinite number of times.

## Case Reports

### DERMATITIS GANGRENOZA (BULLOUS) IN A NEWBORN INFANT\*

By MAGNUS A. TATE, M.D., CINCINNATI, O.

THE following very brief case report, with drawings of infant S., is of interest for the following reasons: Diagnosis, extent of involvement, rapidity of gangrenous spreading, and rarity of the case.

*Maternal History.*—Mrs. S., primipara, eighteen years old, entered the obstetrical service of the Cincinnati General Hospital May 27, 1920, and left June 9, 1920. General physical condition, pelvic measurements, and urinalysis normal. Vertex engaged, right occipitoanterior; fetal heart heard in the right lower quadrant. By measurements and history of date of last menstruation pregnancy was computed to be at full term sometime in August. A few pigmented scars on back suggested lues; but



Fig. 1.—This and the following illustrations show the character and distribution of the bullous eruption on the face and extremities.

her personal history was good; she denies venereal disease, and has always enjoyed good health, with the exception of diseases incident to childhood.

Labor pains were strong and effective until the head reached the perineum, when progress was arrested. Forceps were then applied and delivery easily accomplished.

The child was delivered apparently lifeless, but was promptly resuscitated. Male;

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.



white; full time; weight, 7 pounds and 4 ounces; length, 50 cm.; cord and genitals normal. General appearance: Numerous bullæ on face and body; entire occiput soft and flabby to touch; mouth and tongue covered with mucous patches; gangrenous patches on both feet; the large toe on left foot and the second on the right are undeveloped. The gangrene of the feet spread until it reached half-way up the legs, involving the whole of both feet, and on close examination it gave the sharp line appearance as if a cord had been tied around them. On the left hand the first and fourth fingers were gangrenous, and the third finger partially so. The thumb and

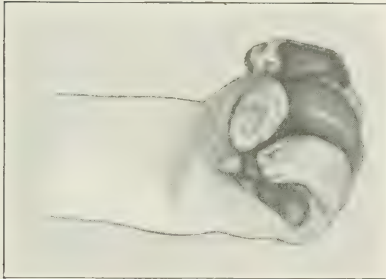


Fig. 2.



Fig. 3.

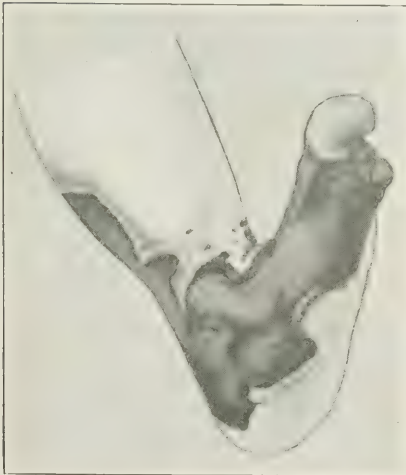


Fig. 4.



Fig. 5.

first finger of the right hand were partly gangrenous. The child died on the seventh day.

Our dermatologist, Dr. Tauber, gave the following diagnosis: Dermatitis gangrenosa (bullous), probably secondary to a luetic base. Specimens of blood from the mother and from the longitudinal sinus of the infant gave a negative Wassermann.

Mr. Horman, artist to the Cincinnati General Hospital, kindly made the drawings three days before the child died, and as this condition is so unusual I present it, as I am not cognizant of a like case in literature.

19 WEST SEVENTH STREET.

## REPORTS OF FIVE CASES OF TUMORS OF THE PELVIC ORGANS\*

BY G. VAN AMBER BROWN, M.D., DETROIT, MICH.

THERE is no field of medicine so depressing as the study of the results obtained in the treatment of cancer; and I offer these reports for whatever value they may possess with the hope that they will, at least, create a free discussion and create new interest. Of the five cases, four are living. The present condition of the four will be given in the individual reports. I particularly wish for a free and frank criticism of the treatment rendered the case of cancer of the cervix. The two cases with solid tumors of the ovary to be reported, remind us, in both the young and the old, that during our clinical study of cases of pelvic tumor not directly connected with the uterus, we should bear in mind the possibility of the pathology shown in the cases.

CASE I.—*Papilloma of bladder.* (5269.) Housewife; forty-five years old; entered Providence Hospital November 9, 1919. She was a very large, tall, stout woman, and her general physical condition seemed perfect. She had always been in excellent health, with the exception of the diseases of childhood and, about fifteen years ago, she had a severe attack of pain in the upper abdomen associated with vomiting. These pains settled in the right lower abdomen. She had several attacks, the last about six years ago. Her present trouble seems to have begun ten months ago with frequent bloody urination. There was no pain. Three times the patient noticed small shreds passing with her urine, and a couple of times little pieces obstructed the urethra, coming partially out and then again returning to the bladder.

Cystoscopy revealed a tumor of the bladder the size of a hickory nut appearing as a cluster of grapes, which was located a short distance above the right ureteral meatus. *Diagnosis:* Papilloma (benign.)

*Treatment.*—The mass was fulgurated, November 9; and during the following 90 days this was repeated four times, or a total of five applications.

*Result.*—Seven days after the first treatment, cystoscopy revealed the tumor about one-third the original size. Two weeks later came the report by telephone, "no bleeding." April 12, five months after the first treatment, cystoscopy showed that the growth had entirely disappeared, leaving a red scar. July 3, 1920, no scar discernible, bladder perfectly normal.

CASE II.—*Advanced Carcinoma Uteri.*—(305.) A housewife; thirty-eight years old; entered Providence Hospital, January 15th, 1920. Family history good. Menstruation began at fourteen years; regular and of 28 day type. Married at eighteen; five children living and well; one miscarriage following fourth child; husband living and well; last baby born eight months ago. For over a year patient has noticed slight bleeding between periods. Flowed twice while carrying her last baby. This occurred about the fifth or sixth month. Flow regular since birth of last child,

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\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

except last three weeks some clots were passed. No pain or other disturbances associated with the bleeding. Patient feels well otherwise; no pain in any part of the body; always somewhat constipated; no shortness of breath; no urinary disturbance; no swelling of legs; gained weight in last few years; no weakness until recently; is well developed and weighs 150 pounds; complexion sallow; pupils react to light and distance; mucous membrane pale; tonsils slightly enlarged and show evidence of inflammation; chest negative; abdomen large, loose, and pendulous, with marked increase in fatty tissue; no rigidity or tenderness; no palpable masses in abdomen or pelvis. Vaginal examination reveals a large, rough, hard, bleeding mass growing from the cervix and extending well out into the anterior and posterior vaginal walls. Examination under anesthesia showed that the rectum is infiltrated with the growth as is also the perimetrium. The infiltration is so extensive that the whole appears as if set in masonry. *Diagnosis:* Advanced carcinoma of cervix uteri. *Prognosis:* Hopeless. Tissue was taken by sharp dissection from the cervix for microscopic study. Pathological report, January 22, 1920: The tissue has the consistency of new growth of epithelial structures. Representative sections are taken.

*Microscopical Examination.*—The entire tissue is extensively infiltrated with rapidly growing neoplastic tissue of squamous celled type in medullary arrangement. The tissue borders are quite densely infiltrated with small round cells. Along the margins there are numerous giant cells. In some places the tissue shows some fatty degeneration and also some red blood cell extravasation. In other places there are aggregations of lymph cells.

*Diagnosis.*—Extremely active, rapidly growing, medullary, squamous celled carcinoma of the cervix uteri.

February 18th, it was decided to do the Percy operation, since no other form of treatment seemed to offer any hope whatever. Through a median incision we did a bilateral salpingo-oophorectomy, and opened the posterior peritoneum on the right side over the internal iliac artery. Just below the bifurcation was an enlarged and broken down lymphatic gland, which was removed. We then ligated the right internal iliac artery and closed the peritoneal incision. The left internal iliac was then exposed in like manner and ligated. The Percy heating iron was inserted through the cervix to the fundus, held by an assistant, while the operator supported the fundus of the uterus with the gloved hand. Heat was employed for 22 minutes, temperature varying from 130° to 135° F. The abdomen was closed without drainage.

*Pathological Report: Macroscopical Examination.*—The specimen consists of tubes and ovaries. The ovaries show cystic degeneration and corpora lutea. The fallopian tube tissue shows fibrosis in the wall. Sections are taken from the tubes and ovaries. Two sections are also taken from tissue which is undergoing degeneration and which is not an integral part of the ovaries or tubal tissue. *Microscopical examination:* The tubal wall has greatly enlarged blood vessels typifying a passive hyperemia, and there is some infiltration of small round cells in this wall. The folds are undergoing an atrophic change. The ovary exhibits cystic degeneration, increase of blood vessels and degeneration of some graafian follicles. The sections taken from the extrinsic tissue show a far advanced and rapidly growing epitheliomatous process. In this tissue there are many giant cells, much necrotic tissue and numerous cell division forms. *Diagnosis:* Passive congestion and early atrophy of the fallopian tubes, cystic degeneration of the ovaries, and far advanced, rapidly growing carcinoma in the extrinsic tissue.

May 3rd, ten weeks later, examination under anesthesia shows that the indurated area is much lessened. The uterus is freely movable, general condition of patient good. No hemorrhage for six weeks. June 7th, Percy heat applied for forty-five



minutes without anesthesia. August 3rd, examination in the office shows upon digital examination no induration about the vagina or cervix, that the contour of the cervix is good, the tissues smooth and gliding, the uterus very small and senile in type, fundus well forward and mobile. Under the eye the parts look normal in color, except a slight thin searing of tissue in the vault of the vagina. The woman looks well, has a ruddy complexion, gained in weight, and states that she feels as well as when she was sixteen. Clinically she is apparently cured. August 24th, three weeks later the condition is the same. By sharp dissection a portion of the cervix was removed for microscopic study, this was followed immediately by another application of the Percy heat, which was used for two hours; the last few minutes the temperature was carried gradually to 190° F. All this without anesthesia.

*Comment.*—It may be interesting to note that, in using the heat without an anesthetic, the patient complained of no pain, there was no hastening of the pulse, no evidence of any shock or distress. On the contrary, the eyes became brighter and the cheeks flushed. When the temperature was carried to 190° F., while there was no pain, she did complain of a slight aching through the abdomen. This, however, amounted to little and soon passed off. She is now about her family duties, feeling well and happy.

A temperature of 190° F. is not recommended, but it was used in this case as a test to see how much heat can be used without producing pain.

A couple of weeks later it was deemed opportune to do the radical operation. This was done September 11, preceded by a cystoscopy; the bladder showed no involvement. The vagina was then painted with tincture of iodine. The abdomen was prepared and opened. We encountered broad extensive adhesions binding the bladder and sigmoid to the uterus, which were freed with much difficulty. The uterus was senile in type. The walls of the blood vessels appeared white, much thickened, and the lumen materially narrowed. It was noticeable that the uterus and the broad ligaments were quite anemic. There was one calcareous gland the size of a lima bean taken from between the folds of the left broad ligament and near the cervix. A hysterectomy was done extending well out into the broad ligaments and including in the dissection the upper portion of the vagina. For the dissection, instead of the knife, the cautery was used. Patient still in hospital and doing nicely.

*Pathologist's Report.*—*Macroscopic Examination.*—The uterus is 7 cm. long, 3.5 cm. in its anteroposterior diameter, and 5.5 cm. in its transverse diameter through the fundus. The peripheral surface is irregular, particularly from the level of the internal os down over the cervical portion. Vertical sections exhibit a myometrium with evident increase of connective tissue, particularly noticeable around the blood-vessels, and showing as distinct white areas of greater density than the remaining tissue. In the cervical portion there are some circular arrangements of the tissue elements. These are approximately 5 mm. in diameter. At the internal os there is a scarred area which extends outward towards the periphery. One section is taken from this area, two sections from the previously described area, one through the fundal wall, two from the smaller specimen of tissue and one from the cervix. Seven of these sections were studied microscopically. In a general way, the entire tissue is extensively vascularized. Almost uniformly the walls show thickening, some hyaline change, and some obliteration of the lumen; the obliteration resulting mainly from intimal change. The media, however, is markedly thickened, but not deformed as in the intima. This applies to both veins and arteries. The tissue exhibits marked cellularity. The supporting tissue is hyperchromatic, and in places it appears completely devitalized. The general devitalization change is seen practically throughout all of the tissues. This is characterized by blurring of cell outlines,

cytoplasmic extrusions and cell disassociation. There is considerable hemorrhage and blood extravasation, also round cell infiltration, both diffuse and localized. There are large and numerous areas of carcinomatous infiltration. Most of these areas appear to be distinctly contracting. This is less noticeable, however, in the smaller cell nests. All of the neoplastic tissue presents the general cell picture of degeneration in addition to being quite markedly swollen and blurred. The neoplastic tissue appears to have undergone more degenerative change than the supporting tissue. Histologically there remains an open question as to whether all cancer cells are devitalized.

*Diagnosis.*—Caloric and atrophic change in carcinomatous and uterine tissue following ligation of blood vessels and repeated application of the cautery.

CASE III.—*Fibrosarcoma mucocellulare carcinomatodes*. (Krukenberg type of tumor). Also an example of Brenner's oophoroma folliculare. (2455.) Mrs. A. F.; fifty-seven years old; entered Providence Hospital May 9, 1920. Her chief complaint was a heavy feeling in the abdomen. The family history was negative. The personal history contains few points of interest connected with the pathology under discussion. The menstrual and marital record shows five children living and well, and three miscarriages. The menopause was passed nine years ago. Oral sepsis and an attack of influenza in 1920.

The patient's abdomen began to enlarge gradually the year before, but did not cause discomfort until about one month ago, when a heavy feeling in the pelvis with frequent urination appeared. There has been a loss of weight, strength, and appetite recently; also abdominal pain after exertion, and frequent urination.

*Preoperative Diagnosis.*—Ovarian cyst. Findings at operation: A large amount of free fluid in the peritoneal cavity; two degenerating tumors, regarded as fibroids, each equalling a grapefruit in size and attached to the right and left tubes at the uterine cornu. The left was readily lifted out of the abdomen without freeing attachments. The right had a broader, but shorter pedicle. After removal of the tumors the uterus was fixed to the anterior abdominal wall. Before closing the incision, the abdomen was explored thoroughly. Further findings were negative. At this writing patient is in good health.

*Pathologist's Report.*—*Macroscopical Examination.*—Two tumors from the right and left uterine adnexa. The specimen is in two masses and is multinodulated. One mass is attached to tissue that resembles the parovarium, and at one end of this tissue there is a structure that resembles the distal end of the oviduct; from this, one section is taken and one also from the tissue resembling parovarian structure. The cut surface of the mass shows a pillar-like arrangement of structure with definite encapsulation. In places there is the so-called red fibroid type of degeneration taking place. There are also areas showing liquefaction change. One section is taken from the peripheral border, one from an area showing liquefaction change and another from the border where there is multiple nodular arrangement. The second mass shows marked discoloration through the capsule and one plane shows multiple areas of hemorrhage. One section is taken from the capsule of this mass. This does not show the pillar arrangement, but is a radiating structure from a central scar.

*Microscopical Examination.*—The section of Fallopian tube shows marked old atrophic deformity of the plicæ, mucoid degeneration in the wall with focal areas of chronic infection, also areas of calcification and some areas exhibiting new blood vessel formation. The epithelial cells in some of the plicæ show hydropic change and also hyperplasia. One section of ovary exhibits a peculiar multiplicity of graafian follicles. The follicles show both hyperplasia and hyaline change of epithelium. Some show marked cystic outlines. Within many of the follicles are

masses of more or less hyalinized blood. The epithelium in many places shows separation from the stroma. The stroma is a loose reticulum in which are many new shepherd crook form of cells. In certain areas there is extravasation of blood involving both the stroma and the follicles. In some zones there is marked infiltration of eosinophiles and pus cells. In the tunica there are small foci of pus cells, considerable red blood cell extravasation, and some unusual dilatation of the small blood vessels. Another section exhibits the multiple follicles in an older stroma which is a modified, endemic-like, ovarian pattern. The majority of the follicles in this section are filled with hyaline blood material which stains brilliantly with eosin. The surrounding stromal tissue is undergoing necrotic change. In another section the above condition is repeated. Through part of the section the connective tissue shows perversion changes with cell division. In another section there is clearly-defined new growth with a rather sharp line of demarcation in which there are outlines of the follicles, all of which are filled with perverted epithelial cells showing basophilic and eosinophilic standing reactions. These cells, however, are not strictly confined, but are in places infiltrating the stroma.

*Diagnosis.*—Fibrosarcoma mucocellulare carcinomatodes (Krukenberg type of tumor).

CASE IV.—*Chorionepithelioma malignum with multiple fibroid tumors in uterine tissue.* (3109.) Housewife; thirty-five years old; entered Providence Hospital complaining chiefly of a lump in the abdomen. Her father died of locomotor ataxia; one sister had cancer of breast; one uncle had tuberculosis. Patient has had measles, mumps, chicken-pox, scarlatina, rheumatism, and tonsillitis. Married nine years; no children. Menstrual record is negative, except that one period was missed in November, 1915, and one in May, 1920. In September, 1919, a lump was observed in the right lower abdomen; there was no pain but occasional weakness. For one month there has been nausea; the last menstrual period has been suppressed.

*Physical Examination.*—Two masses are palpable in the lower abdomen. *Clinical Diagnosis.*—Multiple fibroid tumors of the uterus. Operation. Good recovery.

*Pathological Report.*—*Macroscopical Examination.*—The specimen is a multiple fibroid tumor of the uterus; subserous, interstitial and submucous in position. In one area there is degeneration and probable proliferation. Numerous sections are taken from the area. Nearly all of the fibroid areas are well preserved. *Microscopical Examination:* The tissue shows chorionic villi with hyalinized epithelium and degenerated mesothelium, also areas of infection. The epithelium exhibits its syncytial and Langhan's layers. At different places there are infiltrations of mononuclear cells, also new blood vessel formation. The entire structure shows degenerative changes resulting from deprivation of blood supply.

*Diagnosis.*—Chorionepithelioma malignum with multiple fibroid tumors in uterine tissue.

CASE V.—*Lymphoblastoma (lymphosarcoma), primary in the ovary or parovarium of a child five years of age.* (2935.) Girl, aged five; entered Providence Hospital June 1, 1920, complaining of pain on left side of the hip, and distress in the abdomen. Her family history was negative except that her mother lost two children by miscarriage, each at 3½ months, and had had some kind of kidney trouble. Child had two attacks of measles. About two months ago she complained of headache and earache, both of which responded favorably to treatment. She was always constipated; cathartics were given almost daily and at 2½ years she, probably, had a urethral infection. Present illness began about the eighteenth of February, 1920, with bilateral abdominal pain of a dull character and lasting about one week. Since May 28, urine has been passed only in small amounts, from a few drops to a



teaspoonful at a time. Temperature, 100° F.; pulse, 130; respiration, 32; patient is pale, of blond complexion, lies quietly, and is, apparently, without pain. She does not lie straight, and her head is turned to one side. Peripheral circulation is poor. Eyelids are swollen, conjunctiva is reddened, and nose pinched. Tonsils are large; pulmonary edema; heart action rapid; abdomen large, distended; skin glossy, umbilicus protrudes. Percussion dullness from fifth intercostal space to 3 cm. below costal margin. Absolute dullness is diffused over a large part of the lower abdomen. Palpation reveals a large nodular mass which is not freely movable. On right groin enlarged lymphatic gland the size of an almond. Von Pirquet negative. Extremities slightly edematous. Laboratory tests: urine contains pus. X-ray of urinary and digestive tracts negative. Diagnoses considered: (a) sarcoma; (b) tuberculous peritonitis; (c) hypernephroma.

June 4, 1920, through a low median incision, we removed a growth from the left ovarian region, the right ovary, and one enlarged right inguinal gland. The visceral peritoneum was found thickened and studded with numerous large millet seed sized nodules of whitish color. The parietal peritoneum contained nodules of varying sizes; the largest being 2½ cm. long. A gland in the right inguinal region was 3 cm. long. The omentum was markedly discolored and unusually well developed for a child of five years. It had descended well down into the pelvis to within 4 F. B. of the pubes. The peritoneal cavity contained a large quantity of sero-flocculent opaque fluid. A large multinodular tumor was attached to the left parovarium. The right ovary was six or eight times larger than normal and gave evidence of containing new growth tissue. The uterus and intestine were overdeveloped. The liver contained numerous small rough nodulations. The tumor stump bled profusely and proved difficult to control. Anesthesia: Gas and oxygen. Result: Patient died of shock at the end of 22 hours. Autopsy.

*Pathological Report.—Macroscopical Examination.*—The specimen consists of a tumor from the left parovarium, right ovary, and right inguinal gland of a patient aged five years. The chief symptoms were abdominal pain, constipation, and night sweats. The duration of the condition was about four months. The ovary is 32 mm. from pole to pole and when sectioned has the appearance of solid tissue throughout and has not the consistency of normal ovary. The cortex and medulla are not demarcated. One longitudinal section is saved representing the entire half of the ovary. The inguinal gland is 25 mm. long. One section is taken through the long diameter from pole to pole. The tumor mass weighs 480 gm., is multinodular and markedly vascular upon the peripheral surface. On the peripheral surface it is studded with small nodular patches which are from 1 to 5 mm. in diameter. These have the appearance of organized seropurulent exudate. The side showing the attachment has a surface about 3 cm. in length. One section is taken from the surface bearing the small nodules, and three sections are taken from the area of attachment.

The sectioned mass shows a surface which is pale pink in color and the resistance to the edge of the knife is that of normal fat. The surface of the mass is constructed of multiple irregular, oval or globular units from one and one half to four cm. in diameter, giving the appearance of a composite adenomatous growth. Some of the peripheral nodules show degenerative changes characterized by small areas inclosed within narrow, irregular, white fibrous-like borders. One section is taken from the peripheral nodule undergoing degeneration, and one from the center of the entire tumor mass.

*Microscopical Examination.*—The section of the ovarian tissue shows the typical ovarian structure of a young ovary. The only pathological change is simple hypertrophy. The remaining structures in all of the seven sections examined exhibit a

new growth infiltrating ovarian and parovarian structures. The ovarian tissue involved by the new growth presents structural characteristics of an adult ovary. The infiltrated structure is composed of lymphocytic cells of perverted morphology. The cells tend towards oval shape rather than globular and all of these cells are hyperchromatic and many are multinucleated, but they are not giant cells. There is marked vascularity excepting where necrotic changes are taking place. In this part of the tissue the older blood vessels are destroyed and many new ones have formed in the marginal portions of the growth. The tissue structure is a mimicry of a lymph gland; there being a difference in vascularity and stroma, both of the latter being increased in the new structure.

*Diagnosis.*—Lymphoblastoma, primary in the ovary and parovarium of a child of five years of age.

908-14 SMITH BUILDING.

(For discussion, see p. 743.)

## CONGENITAL ABSENCE OF VAGINA AND UTERUS\*

BY DAVID HADDEN, M.D., F.A.C.S., OAKLAND, CAL.

A YOUNG woman of 18 was referred to me by a psychiatrist to ascertain why no menstruation had occurred. The girl was fairly well developed for her age and presented no signs of nervous or mental deficiency. Her mother had consulted the psychiatrist fearing that the nonoccurrence of the periods might have a possible injurious mental effect especially in view of the fact that mental symptoms had developed in the father shortly before his death. In view of the physical findings it will be of interest to note that at no time in her life were there any symptoms that presented any periodicity. The girl is athletically inclined and is training as a physical instructor. All the external female body characteristics are true to type and the external genital organs perfectly normal except for a supposed imperforate hymen.

Rectal examination revealed an organ occupying the position of the uterus and not dissimilar in form though about one-third larger than normal. The anterior rectal septum seemed thick enough to warrant a diagnosis of a simple imperforate hymen, though there was no evidence of bulging from retained menstrual fluids.

An attempt made to dissect out the hymen showed that a complete absence of the vagina existed. Dissection carried up to the mass in the pelvis developed a condition that made it impossible to reach the supposed uterus without injury to the bladder or rectum.

As no consent had been given for an abdominal incision, I placed a Hodge pessary covered with rubber dam to keep the dissected area open until a decision could be reached.

A rather complicated problem resulted in view of the supposed presence of a uterus, with the perverted mental family history, as to the advisability of an attempt at vaginal construction. The conclusion of the patient and her mother favored a hysterectomy in case too great difficulty or risk arose in an attempt to construct a vaginal canal.

The abdominal incision revealed a complete absence of the uterus except what was represented by a slight thickening slightly toward the left of the median line on what was a well developed continuous round ligament extending from one

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

ring to the other, though the loop was longer on the right side because of the presence of the body palpated through the rectum.

The round ligaments, tubes and ovaries were normal. Both ovaries showed recently ruptured graafian follicles. The body occupying the position of the uterus was retroperitoneal and thus explained the impossibility of being reached by the vaginal route. An opening through the peritoneum exposed a rounded kidney with a small notch posteriorly. The renal vessels were short and arose near the bifurcation of the aorta and the ureter was less than two inches in length. The kidney was therefore not a descended movable kidney but was originally formed low. Further investigation of the abdomen revealed the ileocecal portion of the bowel fixed in the right renal fossa and incapable of being drawn down or reached without excessive traction.

I resected the thickened portion of the round ligament that represented the undeveloped uterus in order to eliminate the possibility of abnormal changes developing later from some possible remnants of mucous membrane. Microscopically this tissue proved to be involuntary muscle but without uterine formation and no mucous membrane was found.

The construction of a vaginal canal from a loop of intestine was out of the question since the bowel loop would have been seriously interfered with through pressure on its blood supply and a transplantation of the kidney elsewhere was out of the question because of lack of motion and short attachments. In fact the relation was such that an intestinal loop would probably disturb the kidney blood supply.

If the kidney had proved to be a normally developed uterus an interesting conjecture would arise as to the advisability of attempting to construct a vaginal canal from a loop of bowel and the course to follow should pregnancy develop.

OAKLAND BANK OF SAVINGS BUILDING.

(For discussion, see p. 742.)

## LARGE MESOCOLIC HERNIA SIMULATING CHOLECYSTITIS\*

BY INGERSOLL OLMSTED, M.B., HAMILTON, ONT.

A HERNIA into an abnormal fossa in the abdomen is usually only found at an operation when obstruction has occurred. This obstruction is usually preceded by indefinite abdominal symptoms and a correct diagnosis is seldom made before the abdomen is opened. The necessity of recognizing such a condition when met with is self-evident. Large retroperitoneal herniæ are at times difficult to understand unless an ample abdominal incision be made and the especial anatomical structures exposed. A large hernia in the mesocolic fossa is rare.

Mrs. A. W., age twenty-five years, was referred to me in February 1915, by Dr. E. T. Snyder of Cayuga, Ontario. She complained of pain in the abdomen on the right side beneath the costal margin. This pain extended through to her back beneath the right shoulder blade. The pain was not always present, at times it was quite distressing and spasmodic. She was also troubled with constipation. She had no vomiting and her appetite was good except during the attacks. She had two chil-

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dren and one miscarriage. Six months before consulting me, she had had an attack of enteric fever. Otherwise her health had been good. The family history was good. The examination at this time showed a slight yellowish tinge of the conjunctivæ, and some tenderness over the region of the gall bladder. The heart, lungs, kidneys, etc., were normal. The abdomen appeared normal in every way except, as above stated, namely, the tenderness over the region of the gall bladder.

Two years later she was referred back to me. She stated that her symptoms had become more pronounced. She complained of pain and distention in the abdomen, especially after meals. The pain extended through to her back from the region of the right costal margin. She was worse after riding over rough roads. Her meals gave her distress, consequently she ate very little and lost weight. She had a great deal of rumbling in her bowels, and the attacks of pain became of daily occurrence. The patient looked thinner than at her previous visit. The conjunctivæ had still a yellowish tint. The physical examination showed heart and lungs normal; urine normal. There was slight tenderness over the region of the gall bladder, but no rigidity of the muscles and no palpable tumor. The uterus was retroverted. The x-ray examination proved negative for the gall bladder, stomach and bowel.

A diagnosis of probable cholecystitis was made and an operation advised. This was done two days later. A short transrectus incision was made exposing the gall bladder, duodenum and antrum of the stomach. These parts appeared perfectly normal. There were no enlarged glands along the course of the bile ducts. The wound was then covered with pads of gauze and a gridiron incision made, exposing the appendix and right ovary. The appendix showed chronic inflammation and was removed. The hand was then passed into the pelvis and both ovaries and uterus palpated. A peculiar bag-like mass was encountered. It was then noted for the first time that there was a scarcity of the small bowel in the pelvis. The round ligament of the uterus on the right side was then shortened, in order to restore the retroverted uterus, and the gridiron incision closed. A pararectus incision was then made in the left side of the abdomen when a large retroperitoneal hernia was disclosed, containing loops of small bowel. To determine the true nature of the condition present, the original transverse opening in the upper part of the abdomen was enlarged and the transverse colon withdrawn from the abdomen. It was then seen that the upper falciform border of the hernial sack contained the ascending branch of the left colic artery, and was well to the left of the inferior mesenteric vein. The opening of the hernial sack was about four inches wide, and the depth about nine inches, and in the pouch lay at least three-fourths of the small bowel. It could be easily withdrawn, and apparently had been slipping into and out of the sack for a long time. The sac was emptied and obliterated by means of a series of catgut sutures. When the tension was removed from the branch of the colic artery, which lay beneath the free margin of the sac, the artery shortened and became very pronounced. When this free margin was first examined, the pulsation in the vessel could scarcely be felt. A hitch was then taken in the left round ligament of the uterus to help support this organ in its normal position. Both wounds of the abdomen were then closed. The patient made an uninterrupted recovery, and during the last three years has been entirely free of her old symptoms. The drag of the small bowel on the colic artery would account for the pain in the abdomen, constipation and back pains.

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# Society Transactions

## AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-THIRD ANNUAL MEETING, ATLANTIC CITY, SEPTEMBER 20-22, 1920

*(Continued from the March issue.)*

DR. EDWARD A. WEISS, of Pittsburgh, Pa., read a paper on **Border-line Carcinoma of the Cervix and Its Treatment**. (For original article see page 661.)

### DISCUSSION

DR. JOSEPH H. BRANHAM, BALTIMORE, MARYLAND.—The results of treatment of cancer by radium in Dr. Kelly's hospital have been bad in most cases. I want to mention a case that I thought would be of interest and feel that it might be added to those reported. I have used the cautery in separating the cervix from the vagina, and sometimes higher up, in most cases of cancer for several years, completing the operation from above or below in the ordinary way. A little over four years ago I operated on a case that had a well marked epithelial cancer of the cervix that was advanced to a considerable degree. I did the operation in the way I mentioned, but found infiltration extended well up into the right broad ligament a considerable distance from the uterus. I removed the uterus as well as I could, then applied to the tissue the low heat cautery. I told the husband the case was perfectly hopeless, and that she would die in a short time. She is living after four years. This case shows that a low degree of heat is a good thing in these cases.

DR. G. VAN AMBER BROWN, DETROIT, MICHIGAN.—It has been pretty well shown, I think, how much penetration we get with radium, also with the x-ray, and a comparative study of the two is quite interesting. The effects on the tissues of the gamma rays of the radium and the hard rays of the x-ray are the same except in intensity. The attempt has been successful to administer a lethal dose to malignancy with radium at a distance over 6 cm. from the point of application. With the x-ray, on the other hand, 10 cm. below the skin surface may be successfully heated by the so-called cross firing. Bearing in mind the colorature of the skin with an erythema dose of radium, only 25 per cent of the skin dose will reach 2 cm. below the surface, whereas 86 per cent of the roentgen ray will reach 2 cm. below. At 10 cm. below the surface the effect of radium would be only 2.8 per cent of the skin dose, whereas the x-ray effect would be 51 per cent of the skin dose or the x-ray would be eighteen times as efficient as radium at a depth of 10 cm. To my mind this means that in some places one can use radium where for mechanical reasons it is inconvenient to use the x-ray. In cavities such as the throat, bladder, cervix, and vagina you can place radium so as to get the full effect, whereas with the x-ray it cannot be placed close enough to the part. So that for cavity work it would seem that radium is indicated; but for surface the x-ray.

To check metastasis there is no agent which will replace the x-ray because with it we can reach all possible areas of metastasis.

I may have misunderstood Dr. Weiss but I think he spoke of the Percy cautery. We should not refer to it as a cautery but as the Percy heat. Percy has shown to his own satisfaction, at least, that cancer cells exposed to a temperature of 113°F. for ten minutes time are destroyed. So it is a low heat that is used and not a cautery. One stops short of carbonization of the tissues. If you carbonize the tissues the purpose of the operation is defeated, first, by getting as Percy says, the carbon core, which acts as a plug and impedes drainage and a toxemia as a result. The patient dies from this, and not from the cancer. Carbon is a non-conductor of heat, so in the presence of a carbon core, heat is not disseminated. Only sufficient heat should be used to produce sealing of the lymphatics, also, at the same time, cut down the blood supply.

DR. JAMES N. WEST, NEW YORK CITY.—Recently I was preparing a paper on this subject because I thought I had a case of carcinoma of the cervix that had been cured, and that was the only one, and I have been operating for many years and have seen a good many cases of carcinoma of the cervix. The one case I thought I had cured because the patient had gone seven years without apparent recurrence. While I was writing this paper I got a telephone message to make an appointment for an examination of this patient, and found her pelvis, to my great disappointment, filled with carcinoma. This was six or seven years after the operation. She had had a hysterectomy done and follow-up x-ray treatment. I have used the Percy cautery, but not the Percy cautery operation, in combination with x-ray, and my experience has been in line with the last speaker, that the x-ray has more influence in retarding the growth of cancer of the uterus and giving a period of apparent cure than radium. I have made a fair trial of radium therapy, but the results have not been at all satisfactory.

One of the most brilliant results I have had in palliative treatment of carcinoma of the cervix has occurred within the last two years.

A year ago last April a patient with inoperable carcinoma of the cervix appeared at my office. I treated her by the Percy cautery, not by the operation of Percy, using the cautery extensively and for about fifty minutes, with the hand in the abdomen to control the amount of heat applied. This patient appears now to be cured. In addition to the Percy cautery she had the x-ray applied. The woman had been suffering from hemorrhage and a profuse discharge, and the mass, when I opened the abdomen, showed such attachments that it was impossible to remove it. The uterus has diminished in size, and there is no discharge, and to all intents and purposes the woman is well, yet I feel quite sure that the result is only palliative. This is one of the best cases of palliative treatment I have ever had.

Recently I saw a case of cancer of the urethra treated by radium which had been pronounced cured. When I came from the examination room I told the husband that she was not cured; that she still had carcinoma and it was proceeding along the usual lines. He was disappointed. The next thing I heard was she was having injections of nitrite of potassium, and that now she was cured, and he called upon me to close the urethra. On examining the patient I again told the husband that his wife had advanced adenocarcinoma and would not live very long. Six weeks after that she died. She had been twice "cured" of cancer. Of course, the results, and the comparisons and study the reader of this paper has made are extremely valuable, and that is the kind of study we want. He does not make any extraordinary claims for radium, x-ray, or the cautery, but he is studying the question to give us the advantage of his experience and his comparisons of the various methods.



DR. ABRAHAM J. RONGY, NEW YORK CITY.—To my mind the greatest difficulty with cancer of the cervix and uterus is to determine what is a borderline case. Two weeks ago a young woman came to my office who has had four children. She is thirty-six years old; she bled irregularly, spotting and staining for about three months. On examination I found the interior of the cervix cancerous, the disease extending into the anterior vaginal wall. I burned out the cervix with the cautery, and then called in one of New York's most prominent radium specialists to see whether radium could be used in this particular case. He came up there with his biologist, and after examining the woman rectovaginally, and after seeing the slide under the microscope, he came to the conclusion that the primary lesion in this particular case was in the anterior vaginal wall, and not in the cervix. He promptly told me that if I could remove the uterus and cervix, he thought he could cure the cancer in the anterior vaginal wall, with the explanation that there was a possibility of a fistula of the bladder developing.

A week ago I operated and what apparently on examination seemed to be a simple case, with no adhesions, the uterus free, I found associated with the most pronounced chain of glands on either side along the ureter. Beginning away up at the upper portion of the broad ligament, I was compelled to dissect along the course of the ureters on either side, taking out the uterus with it, and as much of the anterior vaginal wall as I could at the time. The patient is doing fairly well. Here was a case that was apparently very simple but that case is not going to be cured by radium. While I have removed every possible visible gland or any gland I could feel about the ureters and uterus, still I am sure there must be glands that I did not remove, and there is going to be a recurrence.

My experience with radium in cancer of the cervix has been unsatisfactory. My cases are sent to men who do nothing but radium work. In all the cases I have had so far, where the cautery has been used and panhysterectomy has been performed, there was a recurrence at the end of six or eight or ten months or a year with the exception of one.

I believe that the problem of cancer is not so much in methods of cure as it is in the fact that these women come to us too late. Somehow or other we must educate the public that every woman who finds she is not quite right, particularly after the menopause, if she has increased leucorrheal discharge in the form of staining or spotting, should go to a physician immediately.

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—The last speaker (Dr. Rongy) has brought out a practical point. Any one who looks over a large number of specimens must be impressed with the fact that very frequently tissues that are removed and are supposed to be normal, or at least but slightly hypertrophied, yet they are found to contain metastasized cancer cells. The first thing that one has to encounter in this problem is the anatomic location of the cancer. This is certainly very difficult, because not always do you have anatomic deformation; not always do you have any hypertrophy, any appreciable change that can be detected by the eye or the tactile sense. So the application of any of these means, without very careful location of the cancer tissues, is very likely to be a failure. The choice of dosage is an important question also. Just what should be the dose, I am not sure that any one at the present time knows, not even those who are constantly working with the radium, x-ray or the cautery heat method. The problem of application to within therapeutic distances and the penetration are of prime importance.

As to the effect upon the tissues, there is first the direct calorific cytoplasmic change; also the changes in the blood vessels, ordinarily an embolic, and then

a thrombotic change. There is also a destruction of lymph vessels, obliteration of lymph vessels, and then we have in addition that change which we are not able to explain, which comes in the interaction of the cells. The cells acted upon by heat are changed cells, and they produce different cell fluids.

DR. WILLIAM SEAMAN BAINBRIDGE, NEW YORK CITY.—I would like to emphasize one or two points and report a case. Too much stress cannot be laid upon the method of examination. Just as a cancerous process can be extended in the breast by manipulation, cancer cells can be passed into the pelvic lymphatics and the case become a hopeless one. This has been proved by Tyzzer and Ordway in experimentation with animals.

The preparation of the patient, it seems to me, is of vital importance and is often overlooked in dealing with advanced cancerous neoplasm. It was my practice for a number of years before the war, and the results have been very gratifying compared with the results of cases treated otherwise, to remember that I had before me a cancer in a patient, rather than a cancer case.

For three days preceding the operation, the patient is given colonic irrigations of bicarbonate of soda—a dram of soda to the pint of water, using eight or ten gallons per day. By thus hydrating the patient with alkaline solution, the acid content of the bowel is diminished and the patient is in better condition to stand operative interference. During and after operation, I use hot saline solution. I pour it into the abdomen when performing the laparotomy, and operate in a practically fluid medium. I have been using hot saline solution in this way for eight or ten years.

Some seemingly irremovable cases of malignant disease have become operable. One patient was sent to me ten years ago with the diagnosis of irremovable, inoperable carcinoma of the uterus, beginning in the cervix. I did the starvation ligature and lymphatic block operation. The patient was prepared as far as possible, for a laparotomy. Both iliac arteries were tied off; the ovaries, uterus, part of the vagina, and all the pelvic glands were removed, including the lymphatic glands from the brim of the pelvis all the way down, plus those in the obturator foramen on both sides.

Three months ago I came in touch with this patient. She is apparently entirely free from cancer, and seems perfectly well, although she was sent to me as a hopeless case.

It will help us, I believe, if we bear in mind another point Dr. Weiss makes. Do not estimate the extent of the disease in the case by the conditions present at the first examination. Much may be inflammatory and mask the true condition. Manipulation will set free a number of cells and thus cause extension of the disease by destroying Nature's barriers. In proportion as there is blood supply there is extension of the growth, and because of this the starvation ligature operation is of real value.

A lowered general vitality, as well as a lowered local vitality, has some relationship to cancer. Insofar as the essential cause of cancer is concerned, we have not made any more progress than did Hippocrates. It is a complex disease. During the past one hundred and fifty years we have whittled away syphilis, actinomycosis, blastomycosis and tuberculosis, all of which formerly came under the general term of "cancer," and I do not believe we have yet reached the end of differentiation.

DR. WEST.—In the case which you mentioned, did the cancer involve the body of the uterus or the cervix?

DR. BAINBRIDGE.—The cancer involved the uterus but began in the cervix. The case was sent to me by Dr. E. M. Mosher of Brooklyn. When the first

pathologist made the diagnosis I said there must be some mistake, and sent the specimen to three other men; all the reports came back "malignant carcinoma."

DR. WEISS (closing).—I believe with Dr. Brown and Dr. West that the judicious employment of x-ray is a splendid postoperative adjunct. I did not say anything about x-ray treatment because I do not know enough about its practical application, and all such cases for treatment we have referred to competent roentgenologists. Likewise we did not discuss the use of massive doses of radium over the sacrum as a postoperative treatment. It was used in several cases, and in these the results seemed to be better, but it is too early to speak of definite results.

In referring our cases to the roentgenologist, we must be careful in our follow-up if we expect to reach any definite conclusion. My own practice has been to examine the patient with the roentgenologist and so check up our observations. There should be a hearty cooperation between the gynecologist and the roentgenologist in treating carcinoma of the uterus.

As to the amputations we have performed, I may state that we have used the Percy cautery but did not do the Percy operation. My experience with the Percy operation has not been extensive enough to state definite conclusions. I have performed it eight times, and that is too small a series to say anything definite about the method. I regard the Percy operation as a formidable procedure, especially when we consider that those patients are definitely borderline or advanced cases and a severe operation may aggravate matters, or cause a protracted convalescence.

There is one question I wish to put that has no direct relation to the paper. Has any member of the Association present seen carcinoma of the cervix in a complete procidentia of the uterus? I have never seen carcinoma in this condition and am curious to know the experience of the other members. Ordinarily we should expect to find carcinoma a frequent complication of complete procidentia when trauma is constant.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—One of the worst cases of cancer of the cervix I have ever seen in my practice was met with about two weeks ago in which there was a complete procidentia. The cancer had developed long after the procidentia of the uterus had occurred.

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DR. HERBERT W. HEWITT, of Detroit, Mich., discussed **Preparation of the Skin for Operation, with Special Reference to the Use of Picric Acid.** (For original article see page 672.)

#### DISCUSSION

DR. WILLIAM SEAMAN BAINBRIDGE, NEW YORK CITY.—Since doing work in 1915 with the British Army, I have been using largely 5 per cent picric acid in 75 per cent alcohol and have found it very satisfactory. I have seen no burns from it, and the point of having a dry skin previous to the application of the picric acid seems essential to the best results.

While in the service for the past three years, I have been applying ether when it is obtainable, and alcohol when it is not, upon the skin prior to the use of the acid.

One of the unfortunate drawbacks to the use of picric acid is the color which it leaves. I have tried seventeen solutions, suggested by that number of surgeons, and yet the stain does not come off for a long time. Has Dr. Hewitt found something which will overcome this disadvantage?



DR. DAVID HADDEN.—Have you used lithium benzoate?

DR. BAINBRIDGE—No, I will try it.

DR. HEWITT (closing).—In regard to the stain, we have found nothing that will take the stain out if the stain has been on an hour or longer. We have tried a great many things. I recall one instance where we did a prostatectomy in which the urine was quite ammoniacal. We noticed the next day the stain had disappeared. Therefore, my assistant began to use a 25 per cent solution of ammonia in alcohol. We have found it will take the stain off if we could apply the ammonia immediately following operation. We have found in these 926 cases operated on by myself and associates that very few have complained of the stain, even the goiter cases. I do not believe it should be used on the face. I believe that this solution has all of the advantages of iodine and none of its disadvantages.

I sent out a questionnaire some time ago, and some of the members of this Association received a copy. Some of the answers were interesting. I shall tabulate these a little later and send the tabulation back to the men who were so kind as to answer the questionnaire. I sent out 100 questionnaires, and of this number I received 68 replies. Sixty-one men used iodine in some form or other, or in some strength or other, but they did not use it on all parts of the body, and many of them preceded it with soap and water. Others used either alcohol, a solution of benzol or betanaphthol. The preparation was very complicated.

I have seen two recent articles in which it is stated that iodine has caused many disagreeable results so that it has been given up entirely. We have been striving to obtain a solution that can be used in our hospital by all operators including eight surgeons and two gynecologists, of whom nine use this solution and like it.

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DR. GEO. A. PECK, New Rochelle, N. Y., read a paper on the **Treatment of Abortion Complicated by Sepsis**. (For original article see page 679.)

#### DISCUSSION

DR. JAMES N. WEST, NEW YORK CITY.—The paper read refers to abortion with sepsis. It is very difficult to know when sepsis has actually begun. I have investigated this subject in my own clinic at the Post-Graduate Hospital and have tried to draw some conclusions. About twelve years ago I made an examination into the cause of diseases of women entering my clinic, and found that 23 per cent of the cases entering the outdoor department were due to the effects of incomplete abortion. These diseases ranged all the way from thickening of the uterosacral ligaments, retroversion, cellulitis, and other results of inflammatory action in the uterus. The most severe cases did not appear at the clinic, but they came to the hospitals, brought in ambulances, with general peritonitis, septicemia, pelvic abscess or pyosalpinx. This is a very serious indictment of abortion, for the results appear in women at the most important part of their lives, when their usefulness is greatest to their families. It therefore becomes a matter of supreme importance how an abortion should be treated. Finding that 23 per cent of cases seemed to trace the morbidity to abortion, I began to wonder if there was any way I could reduce this terrible morbidity. So I adopted the plan of not waiting for sepsis or anything else, but taking every patient who had come to the stage of inevitable abortion, and curetting them at once, after preparing them as I would for a vaginal hysterectomy, by painting the interior of the cervix with iodine and carbolic, before beginning dilatation. Finally, after cleansing the uterus, I swab the interior with equal parts of iodine

and carbolic. I have not had any of this trouble with abortion cases since, and there is no morbidity. The treatment ends it.

DR. WILLIAM M. BROWN, ROCHESTER, NEW YORK.—I think Dr. West has gone a little outside of Dr. Peck's paper, which dealt with the infected abortions, or the time when sepsis or infection had arisen. I do not think any one can question the procedure adopted by Dr. West, except the matter of the curet. My own custom is not to curette, as I doubt my ability to scrape and denude entirely the endometrium. In cases of incomplete abortion, infected or potentially infected cases, it is proper to disinfect thoroughly. I take a piece of gauze and scrape the endometrium, then I iodinize it thoroughly, and let it alone. There is never any trouble in a case like that after that is done, but in case of infection, I feel that I take the life of the patient in my hands if I invade the cavity with sharp instruments. In such cases, in the absence of hemorrhage or pieces of placenta in the cervix, I let the patient alone and place her in the semi-Fowler position. The ideal bed is one with a Gatch frame spring and a double hinge.

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DR. DAVID W. TOVEY, New York City, read a paper entitled **The Female Pelvic Ureter**. (For original article see page 706.)

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DR. FRANCIS REDER, of St. Louis, Missouri, read a paper entitled **Pathologic Leucorrhea and Its Treatment**. (For original article see page 710.)

#### DISCUSSION ON PAPER OF DR. REDER

DR. ADAM P. LEIGHTON, JR., PORTLAND, MAINE.—I do not know of any condition for which women come to us for relief, that is more annoying than leucorrhea or dysmenorrhea. Of course, many times we can cure a case of dysmenorrhea through the medium of ovarian organotherapy, but I admit and confess that aside from those cases of leucorrhea which are due to vaginitis or specific endocervicitis, which I treat with iodized phenol, douches, and other applications, etc., my results in the treatment of chronic leucorrhea are not good unless I resort to surgical measures. Cases with laceration of the cervix, with leucorrhea, must be repaired. Trachelorrhaphy is necessary. It has been my observation that most of these cases of leucorrhea are due to erosion, and you may treat them forever without any good permanent results. I have made use of the Schroeder amputation quite extensively, which is well known to you, with 95 to 100 per cent good results in the treatment of these cases of leucorrhea due to endocervicitis or erosion which we cannot cure by other means. In the Schroeder amputation we excise a wedge-shape piece of cervix containing the columnar cell glands. Then we sew the cervical apices to the edge of the cervical canal anteriorly and posteriorly with transverse suturing of the cervical incision, thereby removing that tissue in which we find the cause of the leucorrhea.

DR. WILLIAM SEAMAN BAINBRIDGE, NEW YORK CITY.—Not only the internal secretions but toxic poisoning are related to these conditions. I have quite a series of cases, that I hope to tabulate very soon, which show that a large number of women who have a mild, persistent leucorrhea, contain in their economy a toxic substance resulting from intestinal fermentation. Very frequently the latter condition is eliminated or ameliorated, and although nothing is done locally for the leucorrhea, it often disappears as the patient gets into

better physical condition. Many of these cases will be cured no matter what is done locally. In one series of cases where there was marked leucorrhea with lumps in the breasts and distinct chronic intestinal toxemia, I prescribed douching, and in another series I omitted this procedure. In both, the stasis was treated. Insofar as I could determine, the results in both sets of cases were practically equal. This would make it appear that the underlying general condition of the patient was the main factor and not the local condition.

I have found picric acid of value. It does not burn; it seems to have a certain protective effect upon the skin by slightly tanning it. I use 5 per cent in 75 per cent alcohol. It is particularly of value around the external genitalia where the danger of burning with iodine is marked.

DR. REDER (closing).—A woman will tolerate a certain amount of leucorrhea which can usually be controlled by an alkaline douche or an astringent suppository, but when she is compelled to wear a napkin she objects. She wants something done.

In regard to the Sturmdorf operation, which was referred to, i.e., a conical excision of cervical muscularis and endocervical mucosa, I cannot speak as favorably as I would like to. The operator does not remove all the tissues that harbor the bacteria responsible for the discharge. An excision according to the technic of Schroeder, i.e., an excision of a square block of the cervical tissue up to the internal os, has given better results in my hands. With an infection extending up to the internal os, it is necessary to remove all tissue from the external to the internal os. Frequently, with the Schroeder operation you will not succeed and a cervix amputation will become necessary. I have been more successful with amputation of the cervix and should give this operation the preference, provided the woman has her family and is near the climacteric period.

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DR. DAVID HADDEN, of Oakland, California, presented the report of a case of **Congenital Absence of the Vagina and Uterus**. (For original article see page 732.)

#### DISCUSSION

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—It is unfortunate that the mesentery was so short that the bowel could not be brought down in the usual way. In the original paper, in which I described the operation, I suggested that in case the mesentery should prove to be too short the sigmoid could be utilized instead. I have never found it necessary to so use the sigmoid, but one such case has been reported in the literature. I think one can always find enough sigmoid to use for this purpose.

If I remember correctly, I have done thirteen of these operations, and in all of them I have found the uterus to be entirely absent as in the case reported by the essayist. In one case for some reason the ovaries had been removed by a previous operator, but with all the others they were present and healthy. The tubes were also present, and in most of the cases a little bit of tissue like the end of the finger representing the uterus.

In my last case I found a curious malformation, in that there was no ascending, transverse, or descending colon. The ileum entered directly into a rather imperfectly developed sigmoid. In this case, however, I was able to utilize a piece of small bowel as in the routine method and she made an uneventful recovery. I



have not been able to find on record any report of a similar malformation. Curiously enough there was a little tit-like process projecting from the sigmoid very much like an attempt at an appendix.

A case was reported a few years ago in New York City in which there was a normal uterus present, but this is the only report of the kind I have seen. In my original paper I suggested that when such was the case one loop of the bowel should be attached around the cervix and the uterus left. Menstruation would then take place normally, and I could see no reason why pregnancy might not ensue. Of course one can hardly imagine that the bowel could stretch like a vagina so as to secure a normal delivery, but delivery would have to be by cesarean section. The uterus was saved in this case.

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DR. CHARLES L. BONIFIELD, of Cincinnati, Ohio, presented a report on **Cases of Postoperative Convalescence Complicated by Faulty Functioning of the Ductless Glands.** (For original article see page 677.)

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DR. G. VAN AMBER BROWN, Detroit, Mich., presented a series of case reports of **Malignant Disease of the Pelvic Organs.** (For original reports see page 724.)

DR. JAMES E. DAVIS, of Detroit, Mich., read a paper entitled **Some Factors that Determine the Tissue Resistance to Cancer.** (For original article see page 668.)

#### DISCUSSION ON THE PAPERS OF DRS. BROWN AND DAVIS

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—I would like to ask Dr. Davis whether he has made any observations about the elastic tissue content of the various tissues in malignant disease. It is well known, as has been shown particularly by Taussig, of St. Louis, that in cases of kraurosis vulvæ a marked change takes place, not only in the squamous epithelium, but also in the underlying connective tissue. The elastic tissue here is markedly diminished. In the very marked cases it is entirely absent and the tissue has a hyaline appearance. It is well known also that upon this type of lesion carcinoma of the vulva frequently develops. I would like to ask Dr. Davis whether he has observed that change anywhere else.

DR. WILLIAM SEAMAN BAINBRIDGE, NEW YORK CITY.—I would like to ask Dr. Davis some questions.

1. Has he found any leads, other than those he has given, for a spontaneous cure of cancer? It is a recognized fact in cancer research work that a certain percentage of mice afflicted with cancer, are spontaneously cured of the disease. Has anything been determined along the line of reaction of tissue which would explain such a phenomenon in animals?

2. It has been asserted by certain operators, and in some centers of medical thought, that glands are obstruction stations to the extension of cancer. This seems quite revolutionary. Only the other day, at a national body, a paper was read which indicated clearly this belief. I heard the paper which contained the statement that the removal of glands not yet affected by the cancer *per se*, but in a state of inflammatory reaction, in juxtaposition or within close association to the cancerous growth, meant the doing away with some of Nature's barriers. I would like to ask Dr. Davis if he has any settled conviction in this matter.

3. A member of the faculty at Edinburgh claims that in proportion as there is acidosis in cancerous tissue there is rapidity of extension of growth. Is there anything to support such an opinion?

DR. DAVIS (closing).—The change in the elastic tissue is always very marked, and disappearance of the elastic tissue is, I think, a fact beyond any question.

As to the spontaneous cure of cancer, I know of no explanation for spontaneous cure except it is that balance we have between tissues. As soon as the normal tissues are prevailing over the balance of invading tissue we have a cure. If it is an epithelial growth, we have connective tissue surrounding it that can overcome that epithelial growth and spontaneous cure results, and with that a shutting off of the blood supply.

As to glands being a means of resistance, I have regarded glands as a definite means of resistance, especially the lymph glands. You may place *in vitro* growing cancer tissue and introduce a bit of splenic or lymphatic gland tissue, and it will kill it off so that the cancer growth will not continue, or if the dose is small enough, you slow down the growth much slower than the usual rate that is being maintained.

As to acidosis, the same principle, I think, can be used in growing the cancer tissue if you add to the alkalinity of the medium to slow the growth, and the same is true in the body unit. There is nearly always acidity produced, and that is why those who advocate a vegetable diet get somewhere with some cases. A vegetable diet will produce a certain degree of alkalinity, and that is why the English school has advocated very strongly the use of a vegetable diet, and with that the addition of an alkali, so that alkalization has proved of value clinically as well as experimentally.

DR. BAINBRIDGE.—I would like to ask another question. If it be true that a strictly vegetable diet tends to diminish the incidence or cure of cancer, how is it that we find so much cancer in mice. Why do we find so much cancer in many people that are purely vegetarians, as shown by a number of reports, such as the Imperial Cancer Laboratory report, and the reports of the French Academy and of Berlin as well? Also, if that be true, why should we not in the active Eskimo people who live practically on meat diet see cancer more frequently, yet among them we find very little, if any, cancer. In some of the domesticated animals we find more cancer than we find in the strictly wild animals that are meat eaters, whether they be wild or in captivity.

DR. DAVIS.—The answer must be given about in this way: The whole question is one of resistance. The Eskimo must have a degree of resistance that he obtains either from climate or from his diet which has a very high fat proportion for the digestion and metabolism of which he must maintain a high alkalinity of body fluids. He has a different type of resistance. You cannot compare mice with the human though the mice are vegetarians. We may take the case of infection by crown gall. This, according to Smith, is identical with cancer and we find it growing in vegetable material. There the cause is a bacterium or a parasite, but the conditions are different in the vegetable. They are different in animals, and so we have in this complex problem so many factors that there is no way of explaining, except upon general fundamental principles of required or developed resistance.

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DR. MAGNUS A. TATE, of Cincinnati, Ohio, presented the report of a case of **Dermatitis Gangrenosa (Bullous) in a Newborn Infant**. (For original article see page 724.)

DR. INGERSOLL OLMDIST, of Hamilton, Ontario, presented the report of a case of **Large Mesocolic Hernia Simulating Cholecystitis**. (For original see page 733.)

DR. CHARLES E. RUTH, of Des Moines, Iowa, presented a paper entitled **Delivery of Adherent Placenta in Abortion**. (For original see page 700.)

*(To be continued in the May issue.)*

NEW YORK ACADEMY OF MEDICINE.  
SECTION ON OBSTETRICS AND GYNECOLOGY,  
STATED MEETING, HELD NOVEMBER 23, 1920.

DR. LILLIAN K. P. FARRAR IN THE CHAIR.

DR. S. DI PALMA reported (by invitation) **Two Cases of Interstitial Pregnancy**.

The occurrence of interstitial ectopic pregnancy, judging from statistics, is infrequent enough to warrant reporting. The cases herein reported are from the gynecologic service of Dr. Irving S. Haynes at the Harlem Hospital.

CASE I.—This patient, 29 years of age, para ii, a Russian, was admitted to the hospital July 20, 1920. In July, 1919, the right fallopian tube had been removed for chronic salpingitis. About six months prior to admission she was curetted for a three months' incomplete abortion. The last regular menstruation was on May 20, 1920, sexual intercourse following ten days later. The present illness began with cramps in the lower abdomen five hours before admission. The patient vomited greenish fluid, became pale and gradually weaker. Laparotomy was performed shortly after admission. On opening the peritoneum a large amount of blood escaped. On exploration of the uterus and adnexa the right tube was not found. The left tube was found normal. A moderate number of small follicular cysts were present in both ovaries. The body of the uterus was slightly enlarged and the seat of multiple small fibroids. On the upper aspect of the fundus, about 1 cm. from the entrance of the fallopian tube, a rupture was found which was roughly circular and about 0.5 cm. in diameter, through which blood oozed freely. The left horn with the tube was removed. The embryo was not found. The patient was discharged cured on the sixteenth day.

*Pathologic report:* Microscopic section through rupture at cornu shows typical chorionic villi. *Diagnosis:* Interstitial pregnancy.

CASE II.—This patient 32 years of age, married, para vii, white, and a native of the United States, was admitted to the hospital October 16, 1920, with the history that all her labors had been difficult and in several instances were complicated by fever. The last pregnancy resulted in a six weeks' abortion. She was not curetted. The menstrual period was two weeks overdue. The present illness began at 10 P.M., the night before admission, with severe cramp-like pains in the lower abdomen, more marked in the left lower quadrant and these continued until admission. She vomited several times, did not faint, but gradually went into marked shock. A diagnosis of ruptured extrauterine pregnancy was made by Dr. Brodhead. On opening the peritoneum dark blood escaped; the peritoneal cavity was filled with blood and blood clots. The uterus was delivered and found slightly enlarged; the left cornu had a small rupture superiorly which was roughly circular and about 5 cm. in diameter, through which there was moderate bleeding. Both adnexa, with the excep-



tion of a follicular cystic ovary, were normal. The left cornu and adnexa were removed. The embryo was looked for but not found. The patient died of sepsis on the eighth day (anaerobic hemolytic streptococcus isolated in blood culture). The postmortem examination revealed no peritonitis and no hemorrhage.

*Pathologic report:* The specimen consists of a fallopian tube about 4 inches long showing no gross pathologic change except at the uterine portion where there is a bulb-like area which, on cross section, shows a hemorrhagic area in wall and lumen. Microscopic section of the enlarged middle portion of the tube shows a dilated tube the lumen of which was filled with masses of large decidua-like deep staining cells, syncytial cells, and typical chorionic villi associated with moderate hemorrhage. The section apparently bisects several levels of the tube lumen as it traverses the uterine wall and gives the picture of isolated spaces lined by granular epithelium, in the uterine portion of the tube. The diagnosis is interstitial ectopic gestation. Microscopic study of the isthmic portion (middle 1/3) of the tube shows a slightly thickened wall with distinctly patent lumen and flattened villi.

The important features connected with these cases are: 1. Previous history of abortion, or pregnancy complicated by fever. 2. Early rupture. 3. Extensive peritoneal hemorrhage. 4. Finding of normal adnexa. These features are important because they tend to explain the course and the cause of interstitial ectopic pregnancy. In reviewing the literature, where a previous history of the patient was given, in most instances a record of previous abortions or uterine infection was obtained. As a similar history was present in the cases herein reported, and the affected and opposite tubes were found normal, and as others have made the same observation, the writer's opinion agrees with that of Farrar in ascribing the cause, except in rare instances, to a previous low grade inflammation of the uterus. The inflammation being severe enough to affect only a portion of the interstitial tube damages its lumen to such an extent as to prevent the ovum entering the uterine cavity, yet not enough to hinder the entrance of the spermatozoa. In cases reported by Farrar, Rose and others, including those just presented, the rupture occurred very early in pregnancy, about the sixth week. Cases have also been reported in which pregnancy went on for a longer period. In my opinion the time of rupture and the amount of intraperitoneal hemorrhage depends on the site of the implantation of the fertilized ovum and the relation of its chorion frondosum to nearby blood vessels. If implantation occurs near the uterine end, the possibility of an early abortion in the uterine end would be apparent. If at the isthmial end, by the trophoblastic action of the chorion frondosum in a place of least resistance, rupture would take place early, generally into the peritoneal cavity, occasionally in the folds of the broad ligament, depending as to whether the attachment of the ovum was on the superior or inferior aspect of the tubal lumen. The hemorrhage from arterioles usually present at this location would be extensive. If implantation should take place between the uterine and isthmial ends, the thickness of the musculature of the fundus and of the uterine wall being considerable in this location, it would seem probably that before rupturing, the pregnant sac would attain a larger size, and the uterine rupture would be attended by a very extensive hemorrhage, from hypertrophied blood vessels if these were involved.

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DR. EDWARD C. LYON reported (by invitation) a case of **Delivery by Cesarean Section after a Previous Normal Labor.**

We are all familiar with the type of case in which the first delivery is difficult and subsequent ones normal, and also with the rarer type of case in which the first delivery is normal and succeeding ones require interference, (due to the first

child being small, or the head settling into the inlet early in pregnancy and being more readily molded, etc.) The case I am reporting does not fall into either of these groups, for the first child was delivered by high forceps; the second normally; and the third by a cesarean section, and yet the cesarean baby was smaller than the one delivered normally. Fortunately all three deliveries were in hospitals and accurate data is obtainable. The first delivery was at the Fordham Hospital, the second and third at the Woman's Hospital.

The patient, white, born in Austria, gives a negative history, no miscarriages, no injuries, no operations. The physical examination shows no deformities, the spine being normal. She was 25 years of age at the time of the first delivery, March 29, 1917. Labor began before admission to the Fordham Hospital and was completed by high forceps 2 hours 15 minutes after admission. The child was stillborn. The patient was discharged on the seventeenth day after delivery. The woman was admitted to the Prenatal Clinic of the Woman's Hospital in the sixth month of her second pregnancy, April 4, 1918. The measurements were normal although the external conjugate was almost borderline, being 18.50 cm. The sacral promontory was not felt. The patient was admitted to the hospital at term, 2½ hours after labor began. The first stage was 12 hours, the second, 2 hours and 20 minutes. The membranes were ruptured artificially, and the delivery was normal,—vertex L. O. A. The child weighed 8 lbs., 1 ounce. The mother and infant were discharged in good condition on the fourteenth day. The woman was again admitted to the Prenatal Clinic when six months' pregnant, May 18, 1920. The measurements were practically the same as before. The sacral promontory was not felt at this time. The chart, however, shows a note stating that there was "some sacral flattening." The patient was admitted to the hospital at term, two hours before regular pains began. The head was unengaged (L.O.A.). The first stage lasted 7 hours. The membranes were ruptured artificially at the beginning of the second stage. After six hours of hard second stage pains the head was still unengaged and showed no tendency to pass the promontory. There was a large caput with marked overriding, and apparently good flexion. The sacral promontory could be reached. Diagonal conjugate found to be 11.50 cm, making true conjugate at least 9.50 cm. A cesarean section was performed and a child weighing 7 pounds 11 ounces delivered in good condition. This baby weighed six ounces less than the one delivered without interference in the same hospital two years before and was normal in every respect. Mother and baby were discharged in good condition on the fifteenth day. Examination in the Follow-up Clinic, one month after delivery, showed the promontory large, irregular and projecting well forward into the inlet. The diagonal conjugate was again measured and found to be the same as before.

The case was given the test of a prolonged second stage (much longer than our custom) under the observation of the resident obstetrician and myself—hoping the head would be forced through. I know we were influenced in our treatment by the history of a previous normal delivery at the hospital and subjected the patient to undue risk by prolonging her second stage beyond the classic 2½ to 3 hours. The case is reported without further comment,—as I have no reason to offer why such difficulty was encountered with the third delivery and not with the second.

#### DISCUSSION ON PAPERS OF DRS. DI PALMA AND LYON

DR. DOUGAL BISSELL.—The case is of a type of interstitial pregnancy which is the exception and not the rule. The rule in interstitial pregnancy is that the embryo develops to a considerable size before rupture takes place, and that seems logical, because the ovum when implanted in the uterine portion, has the

uterine wall to protect it. When the case I am about to describe came under my observation, she was conscious but exsanguinated, with an almost imperceptible pulse. The patient was brought to the hospital without a history but as the abdomen was greatly distended by fluid and the cause seemed self-evident, she was operated upon immediately. On opening the abdomen, five hundred c.c. of salt solution were given intravenously. A great quantity of blood was removed from the abdominal cavity, the examination of the tubes and ovaries showed them to be normal, but near the juncture of the left tube and uterus a small rent was seen in the uterine wall, which we at once determined to be the site of rupture of an interstitial pregnancy. We were more fortunate than Dr. Di Palma, for in examining the blood clots, an embryo was found, which the pathologist determined to be a five weeks' gestation.

DR. GEORGE GRAY WARD, JR.—A case of interstitial pregnancy came under my observation some years ago which had all the characteristics of this terrific catastrophe. The patient was about four and one half months pregnant and was apparently all right so far as she knew. She had severe pain during the night and a physician diagnosed ectopic pregnancy. He telephoned to the Post-Graduate Hospital that he was bringing her in an ambulance. On the way the ambulance collided, the patient was pretty well shaken up and immediately went into profound shock. When she arrived at the hospital she was unconscious and presented all the signs of severe internal hemorrhage. She was taken at once to the operating room and the abdomen opened. The abdomen was filled with blood and an interstitial pregnancy found. The entire horn of the uterus was "blown off." She made a good recovery. I cite this case, as Dr. Bissell has done, for the reason that I think all such cases should be reported; and because they constitute a class of cases in which delay is not allowable. If there is any suspicion of an interstitial pregnancy I believe the patient should be operated upon at once.

DR. HERMANN GRAD.—In the series of 50 cases of ectopic gestation which I reported at the last meeting of this section, interstitial pregnancy occurred twice, and both types of rupture were exemplified. There was one in which there was a small opening in the uterus and in the other the whole horn of the uterus was "blown off" and the hemorrhage was alarming. In this case the question came up whether we should do a hysterectomy or not. The patient was in no condition for extensive operative work, so I simply stopped the hemorrhage by sewing up the rent in the uterus. In the fifty cases reported there were two cases of ectopic pregnancy in which hysterectomy was also done because of complicating conditions. Both of these cases made stormy recoveries. It seems that it is not advisable to do extended surgery in these greatly shocked cases.

DR. L. K. FARRAR.—In the only case of interstitial pregnancy I have had, I opened the abdomen thinking I was dealing with a tubal pregnancy and found an interstitial pregnancy which had not ruptured. I was able to curette out the contents without the necessity of removing the tube that contained the pregnancy. It is my belief that interstitial pregnancy is more common than statistics would lead one to think, as a case of this variety of ectopic gestation might rupture into the uterus and be mistaken for an intrauterine pregnancy and subsequent abortion.

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DR. R. E. HERENDEEN presented a report on **X-Ray Changes in Two Cases of Fibromyoma of the Uterus, and One Case of Carcinoma of the Breast.**

The first patient, a woman fifty-eight years of age, was referred to the x-ray department of the Memorial Hospital for radiation of a large myoma. She com-



plained of inability to void urine, obstinate constipation, nausea and vomiting. A diagnosis was made of fibromyoma of the uterus holding the bladder up in front of it. The patient was given a series of x-ray treatments, beginning Jan. 1, 1920. Three areas were exposed over the lower anterior surface of the abdomen at weekly intervals, each area getting an exposure every three weeks. The dosage was 9 to 9½ inch spark gap, 4 milliamperes, at a distance of 8 inches for four minutes. Later this dose was increased. The patient was not operated upon because of a chronic bronchitis and heart disease, the heart being 1½ inches below the normal line and enlarged to the left.

The second patient, thirty-seven years of age, was referred to the x-ray department in April, 1920, for treatment of a large myoma. The tumor was situated in the lower abdomen chiefly on the right side. The patient complained of menorrhagia, weakness, nausea and eructations. She had marked anemia, the hemoglobin being between 30 and 40 per cent. Because of this she was not considered operable. She was given a series of twelve x-ray treatments, using the minimum skin toleration dose. This dose was gradually increased. Three areas in the lower abdomen were covered as in the preceding case. This patient now presents evidence of being an operable case.

The third patient was a woman 82 years of age with a carcinoma of the breast, which was inoperable because of her age. The lesion was large, ulcerating and extended high in the midaxillary line and to within one or two inches of the right border of the sternum. It was four to five inches in diameter, foul smelling, with considerable discharge. Treatments were begun in March, 1920, the entire right breast being covered, including the supraclavicular region and the right axilla. Eight treatments, in all, were given, and at the present time the ulceration was entirely healed. There was some axillary involvement, and a faint indefinite feeling of induration in the right axilla. There were, however no well marked glandular enlargements and the indefinite feeling of induration might be the result of radiation. This patient, in the speaker's opinion, presents evidences of the results which may be obtained in some apparently hopeless cases.

DR. LEE.—Has the hemorrhage ceased to any extent in the second case of myoma?

DR. HERENDEEN.—It has decreased considerably.

DR. GEORGE GRAY WARD, JR.—How much have these fibroids decreased in size?

DR. HERENDEEN.—In the second case the fibroid has been reduced easily one-half. Perhaps some of the members of the staff of the Woman's Hospital who examined her before she was treated can tell more accurately how much the fibroid has diminished in size.

DR. WARD.—Has the difficulty in urination in the first case been relieved?

DR. HERENDEEN.—The difficulty in voiding has ceased, but there seems to be no marked diminution in the size of the tumor in this instance.

DR. FARRAR.—The first case Dr. Bissell saw and advised against operation on account of the bronchitis and the cardiac condition. The tumor corresponded to the size of a five months' pregnancy. Radium was introduced and there was considerable contraction of the growth. The patient had great difficulty in emptying her bladder and had to be catheterized before she came to the hospital. This trouble disappeared after the use of radium, but Dr. Ward suggested that she be sent to the x-ray department to see what could be done to further contract the tumor.

DR. BROWN.—Have you had any opportunity to observe the effect of treatment on the temperature curve? We have seen the temperature curve go up for two weeks after the treatment and there was a very profuse uterine discharge.

DR. HERENDEEN.—So far as we know there was no change in the temperature. By questioning the patient we found that during the first three treatments the bleeding was entirely controlled, but there was a great deal of seropurulent discharge. Many cases gave a history of increased discharge, But the bleeding was usually very promptly controlled.

DR. BROWN.—I asked because I referred a case to Dr. Herenden and the results were most gratifying. When the patient came into the hospital her hemoglobin was between 30 and 35 per cent and she was having profuse uterine hemorrhages. A chronic cardiac condition absolutely precluded surgery. The uterine myoma extended to within two fingers of the umbilicus. The final result was that the tumor had contracted to the size of a three months' pregnant uterus. I asked about the discharge because in his x-ray treatment of this patient she developed a profuse mucopurulent discharge with temperature ranging from 102° to 104° F., together with an alarming pulse condition. It was found necessary to discontinue the x-ray treatments. The patient's temperature gradually subsided as also did the mucopurulent discharge. Her condition steadily improved, hemorrhages ceased, and after two transfusions of blood of 300 c.c. each the patient was discharged with a hemoglobin of 75 per cent, and in excellent condition. The result was most satisfactory.

DR. HERBERT C. CHASE.—After examining the patient I should say that the uterus has contracted at least one-half. The tumor was practically up to the umbilicus and it is now  $3\frac{1}{2}$  fingers above the pelvic brim.

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**DR. LEROY BROWN reported A Case of Large Hematoma of the Vulva following Normal Labor in a Primipara.**

No instruments had been used and  $\frac{1}{2}$  c.c. of pituitrin was given only in the first stage of labor, when it could not have been a factor in causing this condition. The hematoma was so extensive it had occluded the vagina and pushed back the urethra so that it was almost impossible to catheterize the patient. Six hundred grams ( $1\frac{1}{4}$  pounds) of blood clot was removed, and a great deal was left behind adherent to the tissues. The seat of the original tear was in the left lateral wall of the vagina. The perineum was not visibly torn. Judging from the literature, while small hematoma are very common, such large hematoma are rare. In 20,000 cases reported by De Lee he has had five cases of large hematoma. The treatment, of course, is well recognized. We simply incised the hematoma, took out the clot, put in a few sutures to hold the fascial layers together, and packed the vagina with gauze. A secondary operation will be done if necessary.

DR. LEE.—How long after labor did this hematoma appear?

DR. BROWN.—The obstetric attendant left the patient one hour after labor. At the end of two hours the patient complained of a tingling sensation and pain. Examination showed a tumor, and at the end of two hours it had increased alarmingly.

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**DR. E. W. TITUS** read (by invitation) a paper entitled **An Analysis of Two Hundred Gynecologic Cases Treated with Radium.** (For original article see page 685.)

DR. HIRAM N. VINEBERG read a paper entitled **Myomectomy Versus Radium and X-Ray in the Treatment of Fibroid Tumors in Women under Forty Years of Age**, of which the following is an abstract.

There is to be observed at the present time a singular state of mind in medical men. They are keenly alive to the importance of preserving the menstrual function in women. They hesitate, to their credit, to consign a patient to an operation which would destroy this function. Still, they will refer, without a moment's hesitation, a patient with a bleeding fibroid of the uterus, to the roentgenologist or radiologist, who can only be successful by destroying that function, and in most instances permanently. The statistics of the Mayo Clinic dispel the fear that myomectomy is a more dangerous operation than hysterectomy. In 617 cases of abdominal myomectomy in the Mayo Clinic, there were only three deaths, or 0.5 per cent. My own statistics are very modest in comparison, but are equally good. For a period of about ten years past I have been able to collect 120 cases, 31 from my own private patients, and 89 from the Second Gynecological Service of Mount Sinai Hospital. There was not a single death in the entire series. The ages of the private patients ranged from 22 to 37 years. One was 42 years of age. Nine, or 27 per cent of the patients conceived afterwards. One had two children, seven had one child and one an interstitial pregnancy. All but two of the patients were operated upon through the abdominal route. In none of the patients has there been a recurrence of fibroid growths, or of menorrhagia. The subsequent histories of the hospital cases were not so well known. None, however, had been readmitted for secondary operations and those who had returned to the follow-up clinic showed no recurrence of growths on examination. No appreciable enlargement of the uterus was noted. Three of the patients, one of whom had been sterile before operation conceived afterwards, and went to full term with normal deliveries. Eight patients were operated upon by the vaginal route; the remaining 81 through an abdominal incision.

Apparently unpromising cases lend themselves to myomectomy if one starts out with the determination to save, if possible, the uterus in whole or in part. One of the objections raised against myomectomy is the frequency with which tumors develop later, requiring a second operation. In Mayo's series of 741 cases, only 19 or 2.56 per cent required secondary operations. In 11 cases the operation was performed five years or more after myomectomy. In our own series thus far not a single case has had to be operated upon again although many of the patients were operated upon more than five years ago.

It must be admitted that cases will be encountered now and then in which it is not possible to save the uterus. What we must do then is to save enough of the endometrium to carry on the function of menstruation. Even if we should be baffled in this the patient would be no worse off regarding her menstrual function than she would have been had she been successfully treated with x-ray or radium. On the contrary she would be better off, for her cure would be more certain and complete.

Let me not be misunderstood, I am not endeavoring to make out a case against x-ray or radium, as the title of my paper might indicate. They have their uses in the treatment of fibroids, even in young women. There are certain women to whom the dread of an operation is so great that they will go on suffering pain and loss of blood rather than submit to it. Such patients I refer to the roentgenologist or radiologist; also those who have a constitutional dyscrasia which would render an operation unusually dangerous. I go even further, every patient who consults me regarding a fibroid tumor causing symptoms, is told by me she may have her choice of treatment, either by operation, or by x-ray or radium. I tell her, re-



gardless of her age, that the one (operation) carries more risk with it than do the others, but that in my opinion it is more certain of permanent cure than the others. If she is under forty I try to impress her with the advantages, of which I myself am strongly convinced, of submitting to an operation, the endeavor of which will be to remove her tumor and preserve her menstrual function.

#### DISCUSSION ON PAPERS OF DRs. VINEBERG AND TITUS

DR. GEORGE GRAY WARD, JR.—We have had the radium at the Woman's Hospital for only eighteen months, hence the results so far as the carcinoma cases are concerned are only of tentative value owing to the shortness of time these patients have been under observation.

One or two points in regard to the use of radium. First as to diagnosis. We think that it is of great importance to make a thorough examination at the time the radium is being applied. We use an anesthetic and make an abdominal and pelvic examination in order to recognize any complications that may exist. Often an opinion may be changed after this examination under anesthesia. A diagnostic curettage is indicated in all cases with menorrhagia or metrorrhagia, as we may thus discover an unsuspected polyp, and we may also find a fibroid undergoing malignant degeneration.

As an after-effect of the treatment, there may be nausea and vomiting, though this is usually transient and need not be considered. As to the leucorrhea that has been reported as very troublesome by other observers, we have questioned the patients, examined them and have made careful records, and we cannot note the excessive amount of leucorrhea which others seem to have noted. It has been suggested that this may be due to the extra distance we gain by the use of the 1 mm. brass filter. It is not only that the beta rays are cut off but there is an increased distance of 1 mm., in addition to the silver capsule holding the radium, and in this work 1 mm. makes a difference which is of definite value.

An instance of the value of radium is shown in a recent case under my care. The patient was so anemic from hemorrhages, the result of a fibroid the size of a five months' pregnancy, that the hemoglobin was down to 18 per cent, and red blood cells 1,300,000, and consequently she was in a condition that operation was out of the question, and quick checking of the hemorrhage was imperative. Here we introduced radium into the uterine cavity and stopped the hemorrhage after first transfusing her with blood. We then referred her for x-ray treatment of the fibroid and she is making a gradual recovery. We have come to prefer two tubes of 50 milligrams placed in the uterus in tandem, because in this way a greater surface can be covered, which is an important point in a uterus that is enlarged, and we have found that we get better results by using the radium in this manner.

It is a question whether operation should be combined with radium in cancer cases. I believe that in these cases which are operable or may become operable, it is safer to operate than to rely upon radium alone. Dr. Clark of Philadelphia believes operation is unnecessary as do some others. I have had one early case of carcinoma of the cervix in which after the use of radium I did a radical Wertheim operation and had the entire specimen examined microscopically and it showed no malignant disease. That case ought to be a permanent cure, but I have had two other cases in which all evidences of the disease had disappeared after radium and in which the Wertheim operation disclosed the disease outside and beyond the uterus. One cannot be sure that one does not have involvement beyond the uterus in any case, so I think it gives the patient a better chance if an operation is performed after radium has been used. Reuben Peterson reports in his series of Wertheim cases under observation over five years that 18 out of 47 cases were alive, approximately 40 per cent. If one can obtain such a percentage of radical cures after

five years with the Wertheim operation he is very fortunate and we should not cast aside any method that can produce such results. However, five years is not always a sufficiently long period to enable one to say that the cure is permanent. I had a case in which I did a Wertheim and the patient remained cured for five years, but in the fifth year she developed a metastases in the bones of the pelvis and died. Therefore I believe radium combined with the radical operation where possible should give us the best results. I would summarize the lessons from this report as follows: I believe we have three very valuable aids in combating cancer. Operation is very valuable as shown by Peterson. The x-ray is a valuable aid, and so also is radium. In employing these three valuable aids we must learn to individualize our cases, using sometimes one, sometimes another, and also in combination, according to the conditions which are present.

In reference to Dr. Vineberg's statement regarding myomectomy, I am heartily in accord with his views. In young women myomectomy is the proper procedure, and always remember that if a woman has a small fibroid which has been overlooked at the operation of myomectomy and it subsequently enlarges and causes trouble, still you have the radium to fall back upon.

DR. LEROY BROWN.—I agree with Dr. Vineberg and Dr. Ward with reference to the treatment of uterine fibroids. I am opposed to their routine treatment with radium or the x-ray. We, of course, all favor the treatment of hemorrhage with the x-ray or radium under circumstances where we feel it would not be wise to submit the patient to surgery. Some three or four years ago, in preparing a paper for the American Gynecological Society, I prepared this chart showing the different pathologic lesions associated with fibroid tumor.\* My object in preparing this chart was to show that the majority of cases referred to the roentgenologist for treatment were sent by the general practitioner who has not had impressed upon him the fact that other conditions may coexist with a fibroid which preclude the use of the x-ray or radium for these cases. If we exclude the cases of carcinoma of the cervix and of pregnancy with fibroids, it will be seen that in the 1500 cases 691 cases had some complication which precluded the use of the x-ray or radium, or, in other words,

\*TABLE OF COINCIDENT PATHOLOGICAL CONDITIONS ASSOCIATED WITH 1500 CONSECUTIVE MYOMATA UTERI.

<i>Malignant</i> .....	66
Carcinoma corpus uteri.....	20
Carcinoma colli uteri.....	9
Sarcoma.....	7
Carcinoma of ovary.....	4
Papillomatous ovarian cysts .....	17
<i>Ovarian</i> .....	58
Adenocystoma of ovary .....	36
Intraligamentous cysts .....	3
Dermoid cysts of ovary.....	14
Fibroid of ovary .....	1
Abscess of ovary .....	4
<i>Tubal</i> .....	265
Tubercular salpingitis .....	6
Pyosalpinx .....	58
Hydrosalpinx .....	48
Salpingitis .....	153
<i>Uterine</i> .....	107
Necrotic myomata .....	83
Calcareous myomata .....	22
Tubercular endometritis .....	2
<i>Pregnancy</i> .....	60
Normal .....	51
Extrauterine.....	9
<i>Appendicitis Chronic and Subacute</i> .....	167
<i>Mortality</i> .....	28
Per cent .....	1.86

From "A study of 1500 consecutive cases of myoma uteri operated on at the Woman's Hospital, 1910 to 1917"; Amer. Gyn. Transactions, 1918, Amer. Jour. Obstet. and Diseases of Women and Children, 1918, lxxviii, No. 3.

in practically every two cases of fibroid one has some pathologic lesion which contraindicates the use of the x-ray or radium, and which, on the other hand, makes it advisable to do a surgical operation. How can we pick out those cases having complications? The more one operates in abdominal conditions the more uncertain does he become of making a clear-cut diagnosis of all the conditions present. I confess that I cannot always do it and I think other men of experience will tell you the same thing. It is the fact that we do not know positively what other conditions are present in addition to the fibroid, that makes the general use of the x-ray and radium dangerous. In the cases that we feel are relatively uncomplicated and which are poor surgical risks we adopt the x-ray and radium by choice.

As to the question whether the treatment of hemorrhage by radium necessarily ablates the menstrual function, I have been under the impression that after a year or two the menstrual function returns. However, I heartily agree with Dr. Vineberg that it is more conservative to do a myomectomy to prevent the fibroid from becoming large, for the larger the tumor the more certain are pathologic conditions likely to exist.

DR. HOWARD C. TAYLOR.—There has been little in the two papers with which I disagree. With Dr. Vineberg I agree entirely, that a myomectomy involves a small risk and a small chance of return and can be done for extensive growths if necessary. I prefer to do a myomectomy to using radium in young women in most cases. With one statement I disagree absolutely, that is that the treatment with radium is without risk. That is far from being true. I have seen one death result from radium treatment. That there is a certain amount of danger from radium must be borne in mind. The mortality from operations for fibroid tumors, including complications, as shown by Dr. Broun's table is less than 2 per cent. If only uncomplicated cases were included,—cases that might be selected as suitable for radium treatment,—the mortality would be much less, even approach the risk from radium treatment. There is a definite risk in overlooking malignant conditions and also in overlooking conditions that make the use of radium unsafe. This is true no matter how carefully an examination is made, even if made under an anesthetic.

The results of work done at the Woman's Hospital tally almost exactly with my work and with my results.

One thing I think we should have is a standardized nomenclature for the dosage in the use of radium. One man speaks of so many milligrams, another of so many millicuries and another of so much emanation. This difference in nomenclature is very confusing. At the Woman's Hospital the unit they are using is 100 milligrams which is the amount used by most gynecologists throughout the country and the description of dosage and screening as given by these men are more valuable to me than when other terms are used. If we are going to understand the use of radium we must employ a common language.

In the use of radium in fibroids I have been using smaller quantities than Dr. Titus reports were used at the Woman's Hospital, but I have been using the same screening.

In regard to a discharge following radium treatment, which Dr. Ward says their patients do not have, I think this is not a matter of great import because it disappears in four or five weeks and can therefore be ignored. Most of my cases, however, do have a watery discharge for a time after the use of radium and I always warn patients regarding it in advance.

As to the use of radium in carcinoma of the cervix, I do not believe that we are going to give up operating in malignant conditions of the cervix. In treating a case of carcinoma of the cervix I give the patient an anesthetic in practically every case to apply the radium. Under the anesthetic the radium can be placed in the



most advantageous position, a piece of tissue can be obtained for microscopic examination and the extent of the disease with its bearing on the operability of the case can be determined. If the case is operable the operation should be performed in ten days or two weeks. The use of radium will diminish the chance of implantation metastases and also lessen the chance of infection by cleaning up the cervix as no other agent in my experience will do. The difficulty of the operation is not materially increased by the use of radium. If the operation is done too early there may be some increased risk of infection due to diminished resistance of the tissues.

DR. EDWARD WALLACE LEE.—One or two questions I would like to ask especially in reference to something Dr. Ward said about anesthetizing the patient, making a thorough examination and then introducing the radium. Is the anesthetic repeated every time the radium is used? Would you repeat the same procedure every six weeks or two months when you give a radium treatment, and would you take a specimen by a punch or curette each time you introduced the radium to determine whether the fibroid was diminishing in size and to determine what the diagnosis is after the first or second treatment? Another question I would like to ask is whether the hemorrhage was temporarily increased after the application of radium? I am asking that question because I have seen a number of cases, especially fibroids, in which the hemorrhage has been increased, and in which so far as I personally was concerned, I would not have dared trust to the continued use of radium, and immediately resorted to hysterectomy.

Dr. Taylor brought up a good point when he spoke of the confusing nomenclature in regard to radium emanations, milligram-hours, etc. It would seem that we are coming to the time when the use of radium is given into the hands of the specialist. If the ordinary surgeon or the ordinary gynecologist thinks he sees an indication for radium or the x-rays he should turn the patient over to a man who may not own the radium but has control of it. It is just like a drug, we may write the prescription, but the druggist fills it, and in the same way we may prescribe radium and the patient goes to the radium specialist for treatment.

DR. BAILEY.—So far as the terms used in connection with the dosage, they are easy to understand. A millicurie is the equivalent of one milligram.

In reference to Dr. Herendeen's report of two cases of fibromyoma, the second case is a most excellent result from x-ray treatment. This tumor extended 8 cm. above the symphysis, and is, perhaps, as large as an orange. It is now one-third this size. The first case had a very large dose of radium and I think the result can hardly be attributed entirely to the x-ray. There were two different treatments with radium, one being 2400 mghr. and one 1200 mghr., but with quite different filters from those we use and different from those Dr. Clark uses. We have used a platinum applicator which cuts off all the beta rays and part of the gamma rays. Apparently the filter used at the Woman's Hospital would allow to pass a much higher percentage of gamma rays. This patient received three or four times the dose of radium I would give, so I think the results can hardly be attributed to the x-ray.

I am surprised that more was not said about the bad effects of the treatment. My experience is that the cases return a number of years later showing bad effects and therefore it is better to use a smaller amount of radium. The effect of the radium is to cause a fibrosis which constricts the nerve ends. Even in large fibroids I use a smaller dose than that mentioned by Dr. Titus. It is evident that his dose for a fibroid is greater than my largest dose in cancer of the uterus. The correction, of course, has to be made for the platinum and brass filters. I hope to be able to get as good results and save one half the radium by substituting brass for platinum, following the recent work of Dr. Failla on the penetration of the rays through different metals.

The cancer problem is very intricate and the most unusual things happen. I have had two cases that after the application of radium had Wertheim operations and no cancer was found and these patients died within a year or a year and a half. Another case in which the parametrium was filled with cancer cells, which, however, showed signs of the action of radium, is alive and apparently well after a year and a half; so there is a great question as to how we can take these results. I have come to the conclusion that operable cases should have smaller doses of radium and be operated upon.

As to the fibroids, Dr. Broun's chart is very illuminating. It shows the mortality to be only 1.86 per cent. That might be lessened by radium, but the patients treated by radium in most instances still have some remains of their fibroids and there may be a marked morbidity among these. Before treating a fibroid by radium, we all put the patient under an anesthetic and obtain a specimen for fear carcinoma may be present; but in doing this there is the possibility of opening up avenues for the extension of infection and producing the very morbidity we are trying to prevent. Operable cases may be treated with radium only when it is possible to use cross-fire. Where small doses only are available the operable case should not be treated by radium alone but by radium followed by operation. Of the fibroid cases about 50 per cent fall into the class suitable for radium treatment. Theoretically, in regard to the myopathic hemorrhage cases, they should have the amount of radium that allows the woman to menstruate again. It is true that with a proper dosage of radium they do menstruate and they may even become pregnant. However, adjusting the dose to cure the condition and yet have a return to normal menstrual life a year later is a theoretical consideration that does not work out in practice with any degree of regularity.

DR. JAMES A. CORSCADEN.—I want to comment on Dr. Broun's chart; It is an excellent presentation of what might happen if one does not eliminate the possible complications in fibroids. I think the gynecologist should observe cases treated with radium over a long period and see how many of these conditions have actually caused unfortunate complications. At the Presbyterian Hospital we have been using the x-ray for seven years and radium for four years. We have treated in all 400 patients, 100 being cases of epithelioma. The thing in which we have been particularly interested is in finding out in how many of these cases the various conditions on Dr. Broun's chart have caused disaster. We have had only one such happening so far, and that occurred in a case in which there was not even a fibroid, but a case of metrorrhagia in which a most elaborate attempt was made to eliminate the possibility of cancer, which we did not think was present. Within three years the woman had a carcinoma of the fundus. We cannot say whether it was a new disease or whether the carcinoma was there at the time of the curettage.

We have attempted to classify these pathologic conditions as indicated on the chart. From the diagnostic standpoint carcinoma of the uterus and cervix do not interest us because they are diagnosable. Sarcoma in a fibroid is very rare, there being according to our material only 2 cases of sarcoma in 700 fibroids. In a most interesting article, Witte shows that only a small percentage of sarcomas complicating fibroids cause death, and Dr. Cragin used to teach that it was more dangerous to deal with every fibroid as though it were sarcomatous, i.e., by operation, than it was to ignore the possible presence of sarcoma. We keep on with that attitude. If there is any doubt as to whether or not we are dealing with carcinoma or have an ovarian or tubular lesion we do an exploratory laparotomy. We have had two cases of myomata, both fairly large, which have turned out to be

inoperable. We closed them up and used the x-ray and the symptoms disappeared. In myomata there should be no mortality except through accident. In fibroids we have few accidents from degeneration, probably because degeneration after radium in fibroids usually results in a hyaline, never in hemorrhagic or necrotic, change.

Dr. Broun in his chart has not continued his complicating pathology as far as he might have done; he might add tuberculosis of the kidney, cholelithiasis, ulcer of the stomach, etc. I have seen all these complications of fibroid tumors within a couple of months. One woman with a tuberculous kidney with urinary symptoms supposed to be from pressure of a fibroid required four cystoscopies before the kidney diagnosis was possible.

The point raised was that carelessness in diagnosis was as reprehensible before hysterectomy or any other procedure as it was with radium. The problem remained then one of conscientious endeavor on the part of the gynecologist to use radium always when it should be used and to know when to avoid it. The results are definite in proper conditions.

DR. DOUGAL BISSELL.—I would like to ask whether x-ray is equally applicable to pedunculated and sessile fibroid tumors, and can radium be applied advantageously to pedunculated fibroids.

The fact that some authors claim that pedunculated fibroids are not benefited by the application of radium, and that there is at times much difficulty in differentiating between pedunculated and sessile fibroid tumors, leads me to inquire of the readers of the papers, their opinion regarding the effect of radium on pedunculated fibroid tumors.

I have in mind, two interesting cases which recently came under my observation, and in neither of which could the diagnosis of pedunculated fibroid be readily made.

The first case seen was a woman married three months. On examination there was found a solid abdomen mass extending to the diaphragm. The uterus could not be differentiated from the tumor. The patient had menstruated but once since marriage, and I was of the opinion that we had to deal with a large fibroid of the uterus complicated by pregnancy, and that hysterectomy was necessitated.

On opening the abdomen, I found a ten pound pedunculated fibroid attached to the fundus of the uterus by a pedicle one inch in diameter, and was able to remove the tumor without interfering with the existing pregnancy in the uterus otherwise normal.

The second instance was encountered this morning. Examination showed two hard tumors, each as large as a grape fruit. One tumor extended to the region of the liver, and the other tumor occupied the true pelvic cavity, reaching as high as the navel.

The first tumor, which was to the right, I considered either a pedunculated fibroid, or a thick walled ovarian cyst. The second tumor I believed to be a sessile fibroid of the corpus. In opening the abdomen, I found that the first tumor was a pedunculated fibroid with a pedicle arising from the left side of the uterus, the tumor having been forced over to the right side of the uterus, and the second tumor was also a pedunculated fibroid with its pedicle arising from the right side of the uterus. This tumor was fixed in the pelvis, and prevented all possibility of determining its true character. The uterine corpus was extremely small, the cavity measuring only one inch. The situation of the corpus was in the immediate neighborhood of the coccyx, and therefore a very considerable distance from the fibroid tumors.

This patient had been advised by a most competent gynecologist in a neighboring state, to have radium applied through the uterine cavity, and earnestly advised against operation.



I am of the opinion, after examining the specimen that the influence of radium through the uterine cavity would have been nil, because of the great distance between the uterine cavity and the tumors.

DR. TITUS.—In regard to the question of increased hemorrhage, I do not recall any cases in which the amount of hemorrhage was increased. I remember a few who said they had quite a little hemorrhage following the treatment, but the first menstrual period was not more excessive than previously.

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## Items

The forty-sixth annual meeting of the American Gynecological Society will be held at the New Ocean House, Swamscott, Mass., on June 2, 3, and 4, 1921, during the week preceding the meeting of the American Medical Association at Boston. Drs. Blair Bell, of Liverpool, and W. E. Fothergill, of Manchester, England, have been invited to present papers. Arrangements are also being made for a symposium entitled, "To What Extent Should Operative Delivery be Hastened or Assisted by Operative Measures."

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The thirty-fourth annual meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, will be held in St. Louis, September 20, 21, and 22, 1921.

## Special Article

### TOPICS FOR RESEARCH IN THE DOMAIN OF OBSTETRICS AND GYNECOLOGY

THE following report was prepared by a committee appointed by the American Gynecological Society and presented to the Society at its annual meeting, June, 1920. The members of this committee were Dr. A. H. Curtis, of Chicago, who wrote the section devoted to gynecology, and Dr. Geo. W. Kosmak, of New York, who considered the obstetrical topics suitable for study and research. The report is herewith presented to the medical profession for its consideration.

#### I. GYNECOLOGY

It devolves upon me to introduce this subject and to briefly discuss certain phases as seen from the gynecological aspect. I wish to emphasize that the remarks about to be addressed to you are not a voluntary contribution, but represent the efforts of a committee; that this committee is enjoined to candidly express its views, and that we who submit this report do not in any way claim that our opinions are faultless. Nor do we wish to have our personal records sharply scrutinized by those who wonder why we fail to practice all that we preach.

The time for specialization in the various branches of medicine is at hand; no argument is needed to establish this fact. In our own specialty the tide of progress may tend to isolate the practice of obstetrics, or may produce other changes not thought of at the present time. Be that as it may, endless argument will probably influence very little the scope of our future activity. In any event, it appears better for us to limit discussion of this subject, and to concentrate more effectually upon promotion of the work in hand. Those who are productive will learn to adapt themselves to such changes as occur, and will continue to find a wide range of usefulness.

One keynote to a solution of our problems, I believe, is to be found in unselfishness. Each of us (and I refer especially to those who control college or hospital opportunities) should feel it his duty to provide laboratory facilities for those who wish to work, should give to this department the inspiration of direct personal contact, and should be responsible for moderate financial assistance or see that this is forthcoming. I would especially emphasize that those young men who desire to conduct a combined clinical-laboratory study are entitled to enough clinical material to enable them to carry on this investigation.

Slemons very aptly states that this Society needs to create an atmosphere appreciative of efforts along investigation lines. In this connection, a fundamental prerequisite in the selection of members for the Society, and in the election of our officers, should be productiveness in the furtherance of obstetrics and gynecology; this may be through personal achievement or through opportunities offered and stimulation given to younger men. As an excellent example of one who is helpful to others, I would mention Dr. Billings, who, in sharing his practice, in donation of funds, in visits to the laboratories, in public commendation of scientific work, has contributed so much to our profession. Valuable constructive work has been achieved by our own

members, but individual mention at the present time would smack too much of flattery and would lead us far afield. I would not belittle the pure clinician, but he who fails to contribute his bit in an endeavor to assist medical progress has no proper place in a Society which professes to lead all who feel interest in gynecology and obstetrics.

Passing on to special problems, the so-called "referat" system may be considered. If resumed by the Society it would appear advantageous to assign each topic at least two or, preferably, three years in advance. As suggested by Dr. Gellhorn, an attractive plan would be to select one comprehensive subject, alternately gynecologic and obstetric, the report to be entrusted to two or more men, who should contribute a complete review of the literature, to which they may add their own views and observations. At the time of this report other members of the society should present the greatest number of papers on the same subject, the latter to be strictly limited to personal investigations and studies.

Those who recommend competitive prizes to stimulate research are somewhat qualified in their enthusiasms. A limited experience makes me believe that rewards so given arouse only spasmodic efforts and would accomplish little for us. As a counter-suggestion I would advocate that this Society bestow each year three or more non-competitive prizes to those who publish the best original American contributions to gynecology and obstetrics.

With some misgivings I suggest that we might also consider the publication each year of an honor roll, these names to appear in one or more leading journals, and to comprise a list of those who, during the year, have, in our opinion, made notable contribution of any sort whatsoever to the advancement of obstetrics and gynecology.

Many of us, at previous meetings, have obtained much benefit from papers contributed by men interested in the fundamental sciences. Our enthusiasm should receive a decided impetus from two or three well selected yearly presentations of this sort. Such papers should have a direct relationship to obstetrics or gynecology; otherwise, there is little likelihood that they will inspire us with new ideas for further work.

There is, at present, a great dearth of opportunities for young men who wish to become gynecologists, and it is to this that I particularly wish to direct attention. Within a brief period, four capable applicants, who have already completed a general internship and who are apparently willing to do their utmost to obtain proper training, have applied to us for help. There are at present very meager facilities for aiding such men. This, to my mind, is one of the most vital of problems which confront us, and one which promises to yield if properly attacked; on its solution depends the caliber of our future members.

I would suggest the appointment of a committee entrusted with the task of advising this Society how we can best make openings for desirable candidates who wish to pursue the specialty of obstetrics, gynecology, or both; this committee to be supplied with funds for travel and other expenses of investigation. Their duties would possibly involve conferences not only with our members, but with hospital authorities, with others who control the selection of residents, assistants and laboratory volunteers, and with organizations interested in improvement of hospital standards. When provision has been made for even a limited number of places where young men may apply for work, where they may be free from financial worries, and where, in the course of four or five years, they may develop a proper scientific spirit and a groundwork of technical skill, we need then have no anxiety about the welfare of this Society, or about the future specialty of obstetrics and diseases of women.

ARTHUR H. CURTIS, M.D.



## II. OBSTETRICS

In preparing the portion of the report dealing with obstetric topics suitable for original research and investigation, the undersigned felt constrained to include not merely questions of technical interest, which may still demand further study and can possibly be designated as "unsolved," but also those matters of a wider import in which not only the profession but the laity may manifest a justifiable interest. In some instances the purely technical and the broader phases of a problem may, of course, be dependent each upon the other, and in other cases the coöperation of other specialist branches may be demanded.

The first part of the report is concerned with the purely technical phases of obstetrics, the second with questions of a more general interest. I have found it possible to present only a comparatively small number of topics—there are many more unsolved problems and it is this admitted fact which should make of obstetrics a science rather than an art. When a specialty of medicine or other profession has reached the stage of satisfied completion, then its life is gone. The elements of uncertainty and mystery are the factors which stimulate the desire and interest to solve those problems of which a few are herewith presented.

*The Biologic Diagnosis of Pregnancy.*—The attempt to diagnose pregnancy where the physical findings do not give the necessary information culminated in the attempts of Abderhalden to establish this on a biologic basis. A great deal of dissatisfaction has arisen with this method because of its complex character and apparent lack of specificity. A nonmechanical procedure by means of which we can diagnose pregnancy in its earlier months, is still desired. A review by Bar and Ecalle (*Archives Mens. d'Obstetrique et de Gynecologie*, July, 1919, 8, No. 7) of the various tests employed for this purpose, including the deviation of complement test, the Abderhalden, the intradermal reactions, the changes in the antitryptic power of the serum, and the activating power of cobra venom, prompted the conclusion that the clinical benefit derived from these researches is very mediocre and out of proportion to the efforts made. The results show, however, that the work already done is of importance because, as Bar and Ecalle state, a better understanding has thus been obtained of the mechanism of the rapid adaption of the maternal organism to the development of the fetus, the symbiosis of mother and fetus and its anomalies. The subject, therefore, is of intense interest not only from the practical but the theoretical standpoint and worthy of further attention.

*The Causes of the Onset of Labor.*—Very little experimental work has been done to determine the causes which bring about labor and why they vary in their degree of manifestation. The theoretical explanations previously advanced to account for the same have largely been lacking in physical proofs. It is rather important to devote some attention to this matter, as our methods of inducing labor may be largely reformed by the results of such investigation. The exhibition of oxytocic substances on the one hand, and mechanical appliances such as bougies, gauze packs, and bags, on the other, may perhaps be largely done away with by the discovery of the immediate cause of labor. Although successful in most instances their employment is not strictly physiological.

*The Influence of the Nutrition of the Mother upon the Size of the Fetus.*—This subject has undergone radical changes of opinion in the last decade and a recent study by Ehrenfest seems to show that the size of the fetus cannot be distinctly influenced by dietetic measures applied to the mother. It may be generally assumed that a healthy mother predicates the birth of a healthy and normally developed child but a better knowledge of the process would seem important if we are to influence in any way the size of the child with relation to the maternal passages. Studies on fetal metabolism based on animal experiments have not been completely interpreted and require further elucidation in their relation to the human subject.

*Sterility.*—More thought must be given to the explanation of certain obscure questions relating to this condition. Our knowledge of the mechanical factors is quite well developed but there are any number of cases apparently free from defects in which impregnation does not take place notwithstanding the presence of a normal spermatie fluid. The fact that women who have been sterile with one husband and become impregnated after a second marriage, demonstrates that some physiologic agreement, as it were, must exist between the vaginal secretions and the spermatie fluid. The question of a possible disturbance in this physiologic relationship is still to be worked out and methods for correcting the same developed. Whether artificial impregnation will overcome such faults is a matter that has not been tested sufficiently to warrant satisfactory conclusions but if it is determined to employ the same, some method ought to be devised by which the biological relationship between the two sexes can be tested. The futility of plastic operations in many cases has not been sufficiently impressed upon the profession and they are still done in large numbers. Undoubtedly there are cases in which mechanical procedures may with advantage be employed but the indications for the same should be subjected to further study. The effect of endocrine gland feeding in certain cases of sterility must be submitted to definite experimental trials by those not overcome by mere enthusiasm for these therapeutic measures without sufficient basis in fact.

*The Causes of Abortion.*—In determining the causes of abortion, aside from those of a traumatic character, syphilis has been assumed to be the common factor. Undoubted instances have been described of infections by other organisms, including the streptococcus, pneumococcus, bacillus influenza, etc., and the accident also has been ascribed to the presence of the bacillus abortus of Bangs, but no extended series of observations in the human subject are at hand in which comparative studies have been made of these etiologic factors.

*The Occurrence of Pregnancy after Radium Applications for Uterine Bleeding.*—The increasing employment of radium to check hemorrhage in nonmalignant cases has not been employed for a sufficient length of time to determine what influence this may have on a possible future pregnancy. The question of whether the influence of radium on the ovaries in addition to inhibiting the menstrual flow, also interferes with the production of ova is an important topic for further study; likewise whether such pregnancies if they do occur, are normal, and whether the resulting fetus shows any evidences of maldevelopment.

*The Etiology of Eclampsia.*—This topic is one of constant interest and although the results of treatment based on the supposition that we are dealing with a pure toxemia have been quite remarkable, there is still need of further research in this field. It is possible that our ideas as to this complication of pregnancy must be revised and that we cannot consider the various toxic manifestations as due to one source. Whether so-called pregnancy toxemia is a purely metabolic disturbance or dependent on other causes still remains uncertain. It is not definitely established whether the toxemias of the early months of pregnancy associated with hyperemesis are the same as those of the later months. Whether the theory developed by J. C. Hirst that a subsidence of certain ovarian functions connected with the development of the corpus luteum of pregnancy is at fault, or whether we are dealing with a defect in the adaptation of the growing fetus to the maternal organism, are questions still to be solved. As for the toxemias of the latter months of pregnancy further researches in metabolism are essential. Urinary changes have been pretty thoroughly studied but the chemistry of the blood in this condition is a fruitful field for investigation.

The infectious nature of the toxemias of pregnancy has often been referred to; likewise the possible effect of certain climatic changes. An interesting study

would include a comparison of the incidence of eclampsia with barometric and other atmospheric disturbances as determined by official weather bureau charts. Likewise the occurrence of pregnancy toxemia in groups in certain localities. There is not on hand any extended and related series of observations on this subject.

Although prophylactic measures have undoubtedly reduced the incidence of eclampsia, it is still an occurrence of alarming frequency. Until the etiology of this condition can be placed on a more satisfactory basis the treatment of the same must remain more or less empirical. The pendulum seems to have swung in recent years to conservative methods but a sufficient number of cases have not been treated by this means to warrant the presentation of collected statistics based on the experiences of a considerable number of institutions and observers. Reduction in the protein intake has been considered an essential factor in the diet of toxemic states but the recent work of Epstein and others on edema is rather disturbing to our accepted views. This writer describes cases associated with parenchymatous nephritis in which a hydremia occurs accompanied by a diminished amount of protein in the blood. The latter is assumed to be due to the loss of this material through the urine and Epstein therefore advises the liberal feeding of protein as the most effective way of managing such cases. As edema in pregnancy, aside from the undoubted mechanical causes, is usually assumed to be an accompaniment of disturbed renal function, it is possible that our views regarding the prophylactic feeding of these patients must be reformed.

*The Physiology and Pathology of the Placenta.*—The opinion has gained ground that the placenta is a specialized and highly organized gland which not only governs the gaseous interchange between the mother and fetus but also has a metabolic function which may be compared to that exercised by the bowel. It is also assumed that the placenta develops an "internal secretion" which has been found to have well-marked oxytocic powers. Whether any practical use can be made of this knowledge is still a matter for further study.

Infection of the placenta during pregnancy has been demonstrated by Slemmons, who found in some instances an acute exudative infiltration and likewise demonstrated bacteria in the act of penetrating the placental vessels. He believes that the bacteria enter the placenta by way of the amniotic membranes and fluid but hematogenous infection likewise occurs. Such infection may lead to the death of the fetus shortly before birth and possibly accounts for many stillbirths. In his opinion placental bacteremia is outranked only by syphilis and birth injuries. It is also probable that the incidence of placental bacteremia and intrapartum fever is identical. In view of these facts a more careful routine study of the placenta seems to be demanded, especially in cases of prolonged labor, with rupture of the membranes and also in cases of fetal death. Further research may therefore profitably be undertaken along these lines and likewise the possible effect of infection on the production of monsters—such examinations to include the bacteriology and histology of this organ, which can readily enough be done in any well organized laboratory.

*Puerperal Sepsis.*—Statistics show that puerperal sepsis still claims an enormous number of victims. It is hardly necessary here to present such statistics in detail. Prophylaxis has accomplished wonders but we are still confronted with the large mortality and morbidity of this most serious complication. Conservative treatment is now widely acknowledged, dependence being placed on the recuperative powers of the patient. Noninterference is very generally insisted upon, but in the face of a general invasion of the maternal organism which cannot be controlled, we must look for some more radical means of cure. The injection of sera, vaccines, antitoxic substances, chemical germicides, etc., have been taken up in turn, only to be largely abandoned as unsuitable. But the war against puerperal fever must be kept up and there



are certain factors in the etiology that still need elucidation. It is possible that examinations of the vaginal secretions as a routine measure may lead to prophylactic suggestions. We are quite thoroughly informed of the bacteriology of the genital tract after infection takes place, but considerable uncertainty still exists regarding the same in the antepartum stage.

*Statistics of Cesarean Section.*—The indications calling for the performance of cesarean section and the advantages associated with the various types of operation may be accepted as quite firmly established, but there are certain questions that are not yet satisfactorily determined. Whether cesarean section is preferable to induction of premature labor, pubiotomy, high forceps, version, or other alternative procedures depends to a large degree on the ability of the individual operator and the environment, but we are still in need of studies based on a large series of cases from which the comparative morbidity and mortality of cesarean section with other operative methods of delivery can be determined. The occurrence of sterility after cesarean section is also a question that demands investigation.

*Syphilis in Pregnancy.*—With the discovery of the etiology of this disease and certain newer conceptions of treatment, our responsibilities may be said to have increased. Recognition of this disease was formerly based on clinical symptoms and in view of the inability to locate primary lesions in the female genital tract, the diagnosis was often unsatisfactory. Now that the Wassermann test has been accepted as a conclusive means of diagnosis, is it not advisable to make a routine serological examination in every case of pregnancy even where no suspicious symptoms are present? The treatment of syphilis is now definitely established and we have an undoubted means for successfully combating the disease. Its ravages are nevertheless still to be regarded as extensive and in order to eliminate the scourge shall we resort to more radical measures? Would it not be possible to regard a routine Wassermann test in every case of pregnancy in the nature of a prophylactic measure? Heroic steps have been taken to eradicate small-pox and without much question vaccination against this pestilent disease is generally adopted all over the world. Gonorrheal ophthalmia is combated by a routine instillation into the eyes of every newborn child and in some instances a failure to do so is considered an offense punishable by fine or imprisonment. The recent development in the prophylaxis of diphtheria by inoculation in infants may likewise be cited. It has been claimed that at least 40 per cent of women infected with syphilis present no objective symptoms, nor are they aware of their condition. It is characteristic of the disease that both primary and secondary lesions disappear without treatment. This accounts for the wide-spread character of the disease and its innocent propagation. Asylums for the insane and feeble-minded would probably be less crowded if this etiologic factor in the production of their inmates could be eliminated. Hereditary syphilis is without question one of the most important factors in the production of a large train of chronic diseases and as obstetricians we must consider ourselves responsible to a certain degree. As already noted, syphilis is a disease that can be successfully treated and if the numerous suspected cases can be diagnosed and treatment administered, much good will result.

The recent splendid work of J. Whitridge Williams and other investigators, should stimulate the study of material from other large hospitals and an attempt made by the collection of statistics from the entire country, to place our knowledge of the incidence of syphilis in pregnancy on a definite basis. It is possible that the proportion of infected women is overestimated but if a study of a series of consecutive cases shows positive Wassermann reactions in 4 or 5 per cent, it is probable that the distribution is as extensive as is usually assumed. If a diagnosis is made before delivery an opportunity is often afforded for successful treatment. It is necessary, how-

ever, to follow up these cases and by subsequent examinations to determine whether the infection has been eliminated. It may be safely claimed that a more extensive study of this subject covering a large number of cases in widely distributed centers of population will do much to reduce the incidence of the disease in general and at no time can this be more successfully worked out than during the period of pregnancy.

Having considered briefly certain purely technical phases of our subject, attention may be directed to a few of a more general interest.

*Reduction of the Birth Rate.*—It has been grudgingly admitted but it is nevertheless true, that the birth rate of many civilized countries is undergoing a steady decline. Some governments have taken note of this fact and appointed special investigating commissions. Thus England has at work a National Birth Rate Commission, which is about to present a report in which a very broad point of view had been developed with the conclusion that it is necessary to take note of the development and education of young people for worthy parenthood. Thus consideration is given to various methods of education, particularly in physiology and hygiene, to the influences and conditions which favor or retard physical and mental development of adolescence, and the extent to which worthy ideals of citizenship of parenthood should be inculcated by education in its widest sense. Consideration of other matters includes the influence of industrial occupations on the birth rate, the housing problems, schemes for the endowment of motherhood and other factors.

In France, the "National Alliance for Increasing the Birth Rate" has already studied this question along similar lines and has recently even recommended a scheme of State allowance for large families. It appears that conditions in this country are approaching a similar state and that while we have not made as complete a study of the subject, the opinion is gaining ground that we are surely approaching a decline in the birth rate. Is it not appropriate for us as obstetricians and gynecologists to take note of these matters and to bring them to the notice of the proper authorities as a part of the larger interest which our profession should manifest towards the public welfare. This might take the form of a memorial presented to Congress for the appointment of a National Commission to study the subject. Facts and figures will undoubtedly be developed by the recent national census, which can be employed for the purpose.

It would appear appropriate for this Association to take some note of the agitation which is spreading throughout the country for *the development of better maternity care, not only in our large and crowded centers of population but in the rural districts*. The coöperation between this Society and the Federal and State Bureaux which have thus far given their attention to the subject might be coördinated. This is a topic that might well be taken up by a National Department of Health when this is once established and a Secretary to preside over its functions made a member of the Cabinet. The American Medical Association at its last session voted to memorialize Congress on this subject and this Society might well appoint a committee of coöperation when the actual study of some of the problems has been started.

*The teaching of obstetrics* has received increasing attention in recent years—a clear demonstration of the importance of this branch of medicine. The assumption that childbirth was a normal process long served to restrict the development of obstetrics and labeled it as an art rather than as a science. This view has fortunately undergone a change but further reformation in the teaching of obstetrics is necessary to emphasize its importance in the eyes of the profession as well as the laity. Would it not be one function of this Society as the senior organization in the United States of specialists in this branch of medicine to assert its interest in the subject by the appointment of a committee on obstetric education? This body might with perfect right give attention to this important matter and after due deliberation present to the

Society for further discussion and amendment a plan of at least minimum requirements for medical schools in this branch of medicine.

The somewhat cursory presentation of obstetric questions suitable for further research or study which is herewith presented is, of necessity, incomplete. In gathering the material for the same the writer has been impressed with the need of doing something more than merely making an announcement of such problems that might be adopted as a formal report by the Society and then filed away in its archives. It would seem more important and valuable if the organization placed itself in a position to forward original investigation and research. How this may be accomplished must perhaps be left to further deliberations, but the suggestion may be advanced that in place of the temporary committee which has presented this report, a more permanent body be established. This committee should be appointed by the President of the Society and serve at his pleasure and that of his successors. Announcement of its purpose and readiness to coöperate in original research should be published. The possibility of discovering and developing research material would be of mutual benefit to the worker and to our organization, particularly as the latter would then be in a position to assist in the development of its future membership. Whether competitive essays, or some more modernized and practical scheme of publication were developed as the result of these methods, remains for the Society itself to decide.

This thought brings to mind the question whether the American Gynecological Society is to continue as a select, private organization for the personal benefit of its limited membership, or whether by developing an importance based on its progressive growth and influence, it can become a factor for good in the country at large, both among the medical profession and the laity. This may seem like a revolutionary thought, but the various elements in our community life are becoming knitted together very much more closely in these latter days and it becomes necessary for organizations such as ours to take a broader view of their responsibilities. For we have such responsibilities, because our membership is made up of leaders,—leaders whose words and influence must extend beyond their strictly private functions or professional capacities.

We might well make use of the results of such original research in our annual meetings. For example, it has been suggested that a topic for study and discussion be announced one, two, or possibly three years in advance. The arrangements can be placed in the hands of a special committee of two or three, under the direction of the Council, who by correspondence and publication can announce the topic and select from the material submitted that which is considered suitable for presentation. This should be open to nonmembers, who may then be invited to present their theses.

It is with the hope of bringing about such changes that the undersigned respectfully submits the above report.

GEORGE W. KOSMAK, M.D.



# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### New Outlooks in the Radiotherapy of Fibroids and Uterine Hemorrhages

BY GEORGE GELLHORN, M.D., F.A.C.S., ST. LOUIS, MO.

IN the radiotherapy of fibroids and nonmalignant uterine bleeding the object to be accomplished is amenorrhea. If this end in view is attained, the patient is considered cured; if only oligomenorrhea ensues, we speak of improvement which, however, for practical purposes amounts to a cure. Strictly speaking, both treatment and cure are merely symptomatic, but even with this limitation which falls short of the ideal aim in medicine, that of a causal therapy, the new method has rapidly gained citizenship in our gynecologic armamentarium. Impressively large statistics are now at hand which give convincing proofs of the therapeutic value of radio-active agents in the conditions mentioned. Thus, Zweifel<sup>1</sup> reports from Doederlein's clinic that from January 1, 1917 to December 31, 1919, 222 cases of fibroids and 234 hemorrhagic metropathies were treated with x-rays, while in the same period only 91 patients with fibroids were subjected to operation, a proportion of 79 to 21 per cent. In 94.1 per cent of the radiated fibroids amenorrhea was achieved, in the remaining 5.9 per cent oligomenorrhea. Of the metropathies, a complete cure was noted in 96.7 per cent while in 3.3 per cent the hemorrhages returned. Heilmann<sup>2</sup> reports complete cure by x-rays in 96 fibroids and 67 metropathies. Kupferberg<sup>3</sup> treated 325 patients with radium and observed amenorrhea or oligomenorrhea in 315. Of Weibel's<sup>4</sup> 215 cases consisting of 162 hemorrhagic metropathies and 53 fibroids there were failures in 8 of the first and in 6 of the second category; in addition, there were 9 recurrences among the "cured" metropathies and 2 among the fibroids. Permanent cure was, therefore, effected in 204, or 89.1 per cent, of the cases. According to Goetz,<sup>5</sup> Strassmann had 82 per cent cures from x-rays in 67 cases of fibroids. Brettauer<sup>6</sup> achieved by means of x-rays amenorrhea in 25 out of 32 cases of fibroids and oligomenorrhea in the remaining 7. Kelly,<sup>7</sup> from 1913 to 1918, applied radium in 210 cases of fibroids and operated on 45 cases. Of the 210 cases, 28 must be deducted. In all but 11 of the remaining 182, radium was sufficient to relieve the patient. J. G. Clark<sup>8</sup> treated 150 cases of fibroids with radium and had failures only in 4 cases. Clarke<sup>9</sup> cured 49 out of 50 cases of uterine hemorrhages by means of radium. Steiger<sup>10</sup> had only one failure in 59 cases of fibroids treated with x-rays; equally good results were obtained in 24 cases of uterine hemorrhages. Giesecke<sup>11</sup> had a primary success in all of his 38 cases of fibroids treated

with x-rays; one case required operation for necrosis a year later. Of the 183 cases of climacteric bleeding, all were cured but six had to be operated upon for recurrences. All of Siegel's<sup>12</sup> 60 cases were cured by x-rays; likewise the 42 cases of fibroids in Moench's<sup>13</sup> statistics.

Generally speaking, the more recent the reports the better are the results. The reasons for this decided improvement within the last two years are (1) improvements of technic, (2) proper selection of cases. Advances in technic apply to the x-rays as well as the radium treatment, but space precludes the possibility of pointing them out in detail. Several of the questions involved will be touched upon later in this review.

Of vast importance for ultimate success is the proper selection of cases. To the enthusiastic advocate of radiotherapy it seemed at first that this mode of treatment had over surgery all the advantages of a method which was entirely free from danger, devoid of any mortality and morbidity. Gradually a more critical attitude began to prevail. There were the failures to be accounted for insofar as they could not be explained by imperfect apparatus or insufficient dosage. There were certain by-effects which indicated that radiotherapy after all was not an entirely harmless procedure. X-ray burns of the skin could soon be avoided when the importance of adequate filtration was recognized, but there remained the immediate subjective reaction consisting of nausea, vomiting, coated tongue, headache, pains in arms and legs, slight elevations of temperature, and above all, intense diarrheas. These subjective symptoms which varied in intensity in different patients but never were altogether absent, were at first explained by the bad air in x-ray rooms, but they remained unchanged even after better ventilation of these rooms. As Moench<sup>13</sup> points out, these symptoms are most likely due to the effect of x-rays upon the intestinal tract, which is particularly sensitive to the rays. Bruegel<sup>14</sup> has shown that the gastric secretion suffers from the x-rays. Intestinal necroses have been observed even though there was no abnormal reaction in the overlying skin. (Gauss and Friedrich<sup>17</sup>). Mackenrodt<sup>15</sup> found ulcerations in the rectum after protracted x-ray treatment of fibroids in exsanguinated patients near the menopause. Siegrist<sup>16</sup> described a very singular wilting ("Verwelken") of a patient after the treatment, similar to the wilting of flowers after x-ray exposure. This phenomenon is probably caused by an influence of the x-rays upon the cells of the circulating blood. That there is a distinct alteration of the blood after radiotherapy we know from a number of investigations, for instance, those of Siegel<sup>12</sup> who demonstrated a considerable lymphocytosis. As a rule, these blood changes disappear quickly. All these reactions are much less pronounced after the use of radium (Clark<sup>8</sup>) and of shorter duration with the exception of leucorrhea which may persist for several weeks (Graves<sup>19</sup>). Siegrist<sup>16</sup> mentioned the appearance of acute nephritis in 2 cases following x-ray treatment. Pfahler<sup>18</sup> and others speak of an occasional irritation of the bladder.

The effect of radiotherapy on the size of the tumor is variously computed by different observers. Kelly<sup>7</sup> states that of 146 patients of forty years or over treated with radium, the tumor disappeared in 66, and in 48 it had markedly diminished and the pressure symptoms had been relieved. Of 64 patients under forty, the tumor disappeared in 28. Gauss and Friedrich<sup>17</sup> estimate that shrinking of fibroids will occur in from 70 to 80 per cent of the cases after radiotherapy, and

that in a third of the cases the tumor will disappear entirely. Zweifel<sup>1</sup> found a diminution in 86 per cent after x-rays. In nearly every one of Brettauer's<sup>6</sup> 32 cases, a decided reduction in the size of the uterus was perceptible; "in some no vestige could be detected of former large fibroids." There is a marked discrepancy between these findings and the statements of others such as Siegrist<sup>16</sup> who found very slight shrinkage if any, and Moench<sup>13</sup> who noted a very evident shrinkage of metritic uteri but practically no diminution of fibroids.

Aside from the question of shrinkage, the problem of secondary degeneration of fibroids due to radiotherapy, or the possibility of overlooking a pre-existing malignancy looms large. A considerable literature on both categories of cases has accumulated. Cases in point may be found in practically all the statistics cited in the foregoing pages. Giesecke's<sup>11</sup> case of necrotic fibroid, which came to operation one year after x-ray treatment, has already been quoted. Among his 183 cases of climacteric bleeding there were 6 recurrences which required operation later; in 4 of these cancer of the body was found which had escaped notice at the preliminary exploratory curettage. In the first instance, radiotherapy had caused the degeneration of a fibroid; in the second, it had not checked the further growth of an existent cancer. Of the numerous single observations recorded in medical journals or society meetings, only the report by Hinterstoisser<sup>20</sup> may be mentioned. A woman of forty-one was seized, three weeks after x-ray treatment for fibroid, with intense abdominal pain for which she was subjected to operation. An intramural fibroid, the size of a child's head was found bulging into the uterine cavity. Microscopic examination revealed sarcomatous degeneration with numerous necroses.

The desire to forestall failures where practical experience had demonstrated the probability of failures; the wish to avoid the untoward by-effects of radiotherapy by limiting the method to well-suited cases; the necessity, finally, of preventing, as far as possible, the occurrence of necroses and degenerations and of continued growth of pre-existing malignancies—all these considerations have led to a list of clear-cut contraindications which are nowadays observed by the great majority of radiotherapeutists. Zweifel<sup>1</sup> formulates contraindications as follows: (a) fibroids extending above the umbilicus; (b) cases in which the presence of one or both ovaries and a menstruating uterus is desired; (c) all fibroids with malignant degeneration; (d) suppurating or gangrenous fibroids; (e) pedunculated subserous or submucous fibroids; (f) complication with adnexal tumors; (g) fibroids pressing upon bladder or rectum. Siegrist<sup>26</sup> adds to this list the following contraindications: fibroids in women below forty-five; adenomyomas and kystomyomas; rapidly growing tumors; cervical fibroids; any kind of degeneration, including calcification; social; uncertainty of diagnosis.

How can we explain the results accomplished in fibroids and uterine hemorrhages by radiotherapy? There is no difficulty in understanding the action of the rays upon malignant cells for these are essentially immature and therefore more sensitive and more easily destroyed than normal cells. But in nonmalignant conditions the explanation is more complicated. In his work on fibroids and allied tumors, which appeared in 1918, Lockyer, of London, discusses the mode of action of radioactive agents upon fibroids and after analyzing the literature up to that time, he arrives at the conclusion that radiotherapy probably



acts mainly by destroying the ovaries, but x-rays appear to have a direct influence on the cells of the myoma, as evidenced by the coincident shrinkage under the treatment which, when it is achieved, is too rapid to be explained by the inhibited ovarian activity alone. On the other hand, radium and mesothorium, used alone, are not so suitable as x-rays for cases of myoma as no shrinkage of the growth can be expected.

In the meantime, a good deal of valuable material has been contributed by histologic examinations of ovaries and uteri removed after more or less prolonged and intensive radiotherapy. Huessy and Wallart<sup>21</sup> were among the first to attack the subject in this manner. Their conclusions are as follows: 1. X-rays exert an elective and destructive action upon the follicles of the ovary. However, some follicles may escape destruction and retain vitality. 2. The interstitial gland is not only not destroyed but seems to become hypertrophic. 3. X-ray treatment is, therefore, not a genuine castration, because only the follicle apparatus but not the ovarian parenchyma are destroyed. This, perhaps, explains the fact that in many cases the symptoms of artificial menopause are milder than after operative castration. 4. Return of hemorrhages after x-ray treatment and an occasional increase of growth of the tumor cannot be excluded with certainty because with the present technic and the cautions necessary to avoid x-ray injuries, not all follicles can be made to disappear.

In a second paper Wallart<sup>22</sup> describes his findings in the ovaries of an osteomalacic patient who first received deep x-ray treatment and later was subjected to operation. Though in this case menstruation ceased promptly after radiotherapy and this fact as well as the total absence of follicles in the ovaries proved the cessation of ovulation, yet, the cells of the interstitial gland were found considerably increased above the normal. These cells seemed to be stimulated rather than weakened by the x-rays. The observation proved to Wallart that radiation while checking ovulation and menstruation, has no deleterious effect upon the inner secretory function of the ovary.

In Lindig's<sup>23</sup> two cases intensive radium treatment, for fibroid in one, for ordinary menorrhagias in the other case, had preceded operation. In the first case there was a total absence of follicles; in the second the follicular apparatus showed all stages of degeneration. In both instances there was a marked sclerosis of the vessels which, however, did not differ from the vascular alterations which one may find in the ovaries of any multipara. Lindig could find no evidence that the interstitial gland had become stimulated. The investigations of Halberstaedter, Fraenkel, Specht, Roosen, Faber, Reifferscheid and others lead on the whole to the same findings: disappearance of the Graafian follicles and degeneration or destruction of the primordial follicles.

Maury<sup>24</sup> presents, in a well-illustrated article, the results of radium upon animal ovaries. He exposed the ovaries of rabbits to 50 mgr. of radium element for 12 hours, this being the dose which is generally used in cases of so-called idiopathic uterine bleeding. The ovaries of rabbits occupy a rather fixed position in either flank, close to the abdominal wall and just above the crest of the ilium. In this position they are much closer to radium placed on the skin surface than are the ovaries of the human being to radium placed in the uterine cavity. Having less tissue intervening, they are, therefore, most susceptible

to the action of the rays. Nevertheless, in fifteen rabbits so treated, no evidence was obtained that a 600 mgh. dosage of radium produced degeneration of the follicles. Discussing this presentation, Schmitz referred to the human being and likewise considered the action of the rays had an elective action upon the tumor cells; but that the histologic is located almost exclusively in the endometrium on which its greatest power is exerted.

This, too, is the attitude of Miller<sup>25</sup> who believes that the effect of x-rays on fibroids is due to marked structural changes produced in the primordial cells of the ovary; and since the degree of ovarian stimulation governs menstruation, the depression of this function leads to a decrease of blood supply and ultimate shrinkage of the fibroid. While the structural changes produced in the ovary by radium exposure are identical with those induced by x-rays, the control of bleeding is probably accomplished in a different manner, viz., by endarteritis and anemia following the occlusion of the vessels and a specific and direct effect independent of any action upon the ovaries, resulting in extensive structural changes in the endometrium.

Radiated fibroids and uteri have been made the subject of histologic studies by Haendly, Kriwsky, and Rob. Meyer who found an increase of the connective tissue, atrophy of muscle fibers, and hyaline degeneration. The latest paper on the subject is by Schulte<sup>26</sup> who examined six fibroids after x-ray exposure. Schulte's findings coincide on the whole with those of previous investigators. The predominant feature observed was an excessive formation of connective tissue in the fibroids themselves, but also in the myometrium and the endometrium. There was, further, an extensive hyaline degeneration with marked atrophy of muscle fibers, and in two cases also calcification. These changes were much more marked than in fibroids from patients who had not been exposed to x-rays so that some kind of influence on the part of the rays must be assumed. Yet, Schulte does not believe that the rays had an elective action upon the tumor cells; but that the histologic alterations came about by way of the ovaries which had been injured by radiation and in their turn produced a premature age involution of both uteri and fibroids. Vascular changes such as assumed by Miller, were not observed.

Van de Velde<sup>27</sup> has yet another explanation to offer. He ascribes to radium a specific effect upon the tumor cells and claims for it a quick and prolonged action. Gauss and Friedrich,<sup>17</sup> finally, assume that the unfiltered radium rays affect the endometrium, the heavily filtered radium and the x-rays influence the ovary.

It is readily seen from this survey that the whole subject is not yet sufficiently settled to permit of definite conclusions. What we have on hand, however, enables us to modify Lockyer's deductions cited above, as follows: The effect of x-rays in myoma and uterine hemorrhages is essentially a bloodless castration with this limitation that the interstitial gland is not destroyed. The fact that with proper technic and proper selection of cases the symptoms of menopause after x-ray castration are less intense than after operative castration, may be explained by the assumption that the inner secretory action of the interstitial gland is greater than that of the follicles, including the corpus luteum. The effect of the radium is, in its last analysis, a burn of the endometrium. With both kinds of rays, the cells of the fibroid themselves are

affected only very slightly; the changes observed are apparently secondary in nature.

But if the x-rays produce amenorrhea by destroying the follicles in the ovaries, why do we so often observe one or more rather profuse menstruations follow x-ray treatment? This question is dealt with in a paper by Driessen.<sup>28</sup> Assuming that the dosage has not been too weak, he found that treatment immediately after menstruation gave the best results. The monthly cycle consists of two phases; viz. (1) the regenerative phase (4th to 15th day), (2) the secretory phase (15th to 28th day). The first phase is particularly suited for x-ray treatment because during that time the cells of the follicles and the uterine mucosa show very active growth as attested by numerous mitoses, and the effect of x-ray upon proliferating cells is well known.

Seitz and Wintz<sup>29</sup> likewise believe that the influence of x-rays upon maturing follicles and young corpora lutea in the very beginning of the intermenstruum results in prompt cessation of the menses. In the second half of the intermenstrual period, however, premenstrual changes have already taken place in the uterus and ovarian hormones have entered the circulation. Therefore, menstrual bleeding occurs once more even though all ovarian follicles may have been destroyed by the rays. In addition, the technic has a great deal to do with prompt or delayed action. Briefly stated, x-rays should be applied soon after menstruation and in a single dose ("castration dosis"). If smaller doses be given over a certain period of time, the cells of the ovaries have time to recuperate or to become acclimated to the "roentgen virus." To avoid undesirable sequelæ after a single large exposure, the authors recommend to give this castration dose to one ovary after the other on two successive days.

This x-ray castration which is applied to both ovaries must be kept separate from the so-called unilateral x-ray castration which represents the most recent development in radiotherapy. Two papers deal with this interesting subject.

Mansfeld<sup>30</sup> has been quite satisfied with his results in producing amenorrhea in women near the climacteric age. But in younger patients he, like all others, has found the distress of artificial menopause hard to deal with and to relieve. In trying to avoid in this class of patients such an unwelcome aftermath, Mansfeld was guided by his clinical experience that after the surgical removal of one ovary for cysts, ectopic gestations, or adnexal disease, the menorrhagias frequently ceased and the menstruations assumed a normal or even subnormal character. This observation led him to expose in cases of hemorrhagic metropathy only one ovary to deep x-rays. As a rule, he chose the one which seemed the larger of the two on palpation. Of six patients thus treated, five had thereafter only scant menses and no climacteric disturbances. The most impressive result was obtained in a woman of 27, thus far sterile, who had been bleeding every two weeks for the past two years. This patient, after unilateral radiation, became pregnant and carried to term.

Independently of Mansfeld, Pape<sup>31</sup> likewise arrived at unilateral radiation. Starting from the assumption that the uterine hemorrhages under discussion are caused by a hyperfunction of the ovaries, he endeavored to change the latter into a hypofunction and to produce an oligomenorrhea rather than an amenorrhea. A mere reduction in the quantity of x-rays, however, did not seem promising. For even a



small dose may at times produce a complete amenorrhea if the ovaries happen to lie rather superficial. Again, a small dose may act as a powerful stimulant and cause even more profuse and protracted hemorrhages. A unilateral x-ray castration, on the other hand, would perhaps yield the desired result, and his experiments were, indeed, encouraging. Of 23 women between the ages of 39 and 42, 16 became oligomenorrheic, 3 amenorrheic, and 4 were not improved. Of 10 other patients ranging from 25 to 39 years of age, 6 showed prompt results, i. e., had only scant menses during the following 3 to 5 months, while 4 retained their menorrhagias.

Quite recently attention has been drawn to a new danger arising from radiotherapy. Hertwig's experiments on animals suggested the possibility of injury to the fetus from deep x-rays given to the mother; but when Nuernberger<sup>32</sup> broached the subject in the Gynecological Society in Hamburg, the speakers quite generally denied any influence of this sort in the human being. This attitude coincided with other reports in literature which seemed to prove that radiotherapy does not necessarily prevent conception or interfere with the normal course of pregnancy or the development of the children. Pfahler<sup>33</sup> quotes Fraenkel as having seen repeatedly amenorrhea produced in young women for a few months; then the patients became pregnant and gave birth to perfectly healthy children. Almost all statistics of the last few years contain such instances. Only a few can be quoted here. Heimann<sup>34</sup> operated on a patient with carcinoma of the vulva and then applied x-rays systematically for three years; yet, the patient while still under this treatment, conceived and bore an apparently healthy child. Koblanck's<sup>35</sup> patient conceived (and carried out) while being treated for fibroids; and in Edelberg's<sup>36</sup> case the treatment for uterine myoma was instituted during pregnancy but did not in the least interfere with gestation. Pankow<sup>37</sup> published a personal observation of the same kind and appended a very complete review of the literature on the subject, including also the experiments made on animals and plants.

More recently, however, several reports have appeared which put the question in quite a different light. Werner<sup>38</sup> examined three children of the age of five, whose mothers had been given deep x-ray treatment. (The brief account does not state whether treatment was administered before or after conception.) These children seemed vivacious and intelligent but their weight and height were far below that of other children of the same age although the social and hygienic surroundings were in every way favorable.

Heimann<sup>39</sup> mentions the following case: Woman of forty-three. Last confinement 20 years previously. Twenty-three x-ray treatments for hemorrhages due to fibroids. Then conception and premature labor in the eighth month. The male child is now three years old. He is very pale (this feature of pallor is also mentioned in Pankow's case) but without organic defects. The father, a physician, had great difficulty in bringing him up. The boy's intelligence is only fair. He talks very little. He began to walk at 17 months, but locomotion was so reeling and staggering that a neurologist was consulted who, however, could find no organic lesion. Heimann does not consider this case conclusive, but to the reviewer the influence of the x-rays seems highly probable.

Aschenheim<sup>40</sup> describes a case of an imbecile boy of four, with

sunken, nearly blind eyes, unusually small head, and occasional convulsions. The otherwise healthy mother was pregnant about a month when she received four or five deep x-ray treatments for uterine fibroids.

These observations make one pause. If there is danger of physical or mental impairment of the offspring, young women should be exposed to deep radiotherapy only for very cogent indications, and in any case full explanation ought to be made of possible consequences, should conception occur.

Inflammatory conditions within or around the uterus are uniformly considered as contraindications to any radiotherapy. The observations of numerous writers seem to be conclusive on this point. As an illustration, Mackenrodt<sup>41</sup> may be cited who has seen, in two cases, a flaring-up of tubal infections after intrauterine application of radium combined with x-ray treatment. A new proposition, then, by van de Velde,<sup>42</sup> which seems to contradict previous experiences, is all the more interesting. Van de Velde starts from the familiar observation that the approaching menstruation exerts an untoward influence upon an acute salpingo-oophoritis. The acute inflammatory process which above all else requires rest and protection, is stirred up by the cyclic changes in the ovary and the resulting phenomena in the pelvic organs. In these cases, van de Velde has applied radium and x-ray alone or combined and claims to have produced a "temporary" castration. The ovarian function was suppressed for from several months to 1½ years; there was not only no exacerbation of the inflammatory process, but fever and other symptoms subsided, and complete cure could be brought about by a simple absorbent therapy. Similarly good results were obtained in cases of chronic recurrent adnexal inflammation.

There has not been time yet to test van de Velde's claims, and judgment must be withheld until we have heard from others. A few suggestive statements, however, have already appeared. Kupferberg<sup>3</sup> deals with the subject in a short paragraph. He asserts that menorrhagias accompanying gonorrhea of the cervix or inflammatory disease of the adnexa may be cured promptly and without danger by placing radium in the vaginal vault. Martin<sup>43</sup> quotes Ottiker as having cured, by means of radium, profuse hemorrhages in three cases of pyosalpinx. Zweifel<sup>1</sup> has x-rayed fibroids successfully even in the presence of tubal tumors. Siegrist,<sup>16</sup> finally, checked by x-rays the hemorrhages in a case of large myoma which was associated with a tubo-ovarian tumor.

It would, indeed, be gratifying to find that van de Velde has not been too enthusiastic in his conclusions because our present treatment of adnexal disease is by no means satisfactory.

The foregoing review is far from being complete. It only gives a very limited outlook upon the enormous amount of work that has been done in the field of radiotherapy. No conclusions are as yet possible. Everything is in a state of flux. But this much may be said that unceasing efforts are being made to lift radiotherapy out of the crude empiricism of a few years ago and put it on the basis of an exact science.

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## Selected Abstracts

### Mechanism and Management of Third Stage of Labor

**Franz: Physiology of the Third Stage of Labor.** Monatsschrift fuer Geburtshilfe und Gynaekologie, 1916, xliii, 395.

The writer presents a historical résumé of the gradual development of modern views concerning the mechanism of the third stage of labor. His own views, at variance in certain aspects, are based on manual exploration of the uterine cavity under rigid aseptic precautions immediately after the expulsion of the fetus in 96 labor cases. The conclusions based upon these investigations may be summarized as follows: As a rule, the entire maternal surface of the placenta is detached at the same time by but one uterine contraction. Whenever the body and lower extremities of the newborn are expelled by a uterine contraction, the placenta immediately afterwards is found completely loosened. If the second stage ends without a contraction, one more contraction is necessary for detachment. Only if the placenta is located high up in the fundus, or covers a tubal corner, several contractions are required. In most instances the placenta reaches the internal os edgewise exposing the fetal side (Duncan mechanism), rarer the central portion of the fetal side presents itself at the os (Schultze mechanism), and only exceptionally the maternal aspect of the placenta was felt. Franz explains the mechanism of detachment as follows: The intraplacental pressure is raised, the placenta is felt to be enlarged and hard, and thus the relation to the now relatively smaller area of attachment is altered. Whenever the detachment at first is only partial, this increase in size and tension is absent. The normal mechanism of ablation is interfered with and several uterine contractions are required for the completion of separation. Failure to ligate the placental end of the cord, by permitting partial emptying of the placental blood, in an identical manner causes delay in the loosening of the placenta from the uterine wall.



**Franz: Physiology and Management of the Third Stage of Labor.**  
*Monatsschrift fuer Geburtshilfe und Gynaekologie*, 1918, xlvii, 217.

Franz compares in this paper his own views concerning the physiology of the placental stage with those of other modern writers. In this connection he enters into a discussion of the proper time for cord ligation and of the general management of the third stage. He found, by weighing, that most of the placental reserve blood reaches the newborn during the expulsion of the lower portion of the body and approximately within the next half minute. In the majority of instances after that still a little more blood flows into the newborn. This is especially so when the uterus, immediately after the passing of the fetus, had failed to contract promptly. The amount of placental blood transferred to the newborn varies greatly, from nothing, in about 25 per cent of the cases, up to 125 grams in the others. The transference of the blood seems to be effected chiefly by the compression of the placenta, and only to a limited degree is dependent upon the respiration of the newborn. Even complete transfer of all reserve blood does not deplete the placenta to such an extent as to interfere with the normal process of detachment.

In those cases in which the placenta is completely detached immediately after the expulsion of the fetus, pressure against the uterine fundus reduces the total blood loss of the mother. But the opposite effect is obtained, if such pressure is exerted when the placenta is only partially detached. If the uterus by pressure against the fundus is prevented from its physiologic rise, the detached placenta may pass so quickly down the vagina, that the membranes, still partially adherent, may be torn from the placenta. Therefore, in watching the uterus during the third stage it is essential to touch the uterus but slightly in intervals.

**Frankl: Normal Detachment of the Placenta.** *Monatsschrift für Geburtshilfe und Gynaekologie*, 1919, I, 184.

Certain corrections of former views concerning the actual mechanism of the third stage of labor were necessitated by the roentgenographic studies of Weibel. It is most desirable now also to enrich our information concerning the minuter happenings at the site of placental attachment. Cohen, accepting Barbour's teaching, considers three factors as the only possible direct causes of placental detachment: (a) a relative disproportion between the maternal side of the placenta and the area of attachment after the uterus has retracted over the expelled fetus; (b) formation of a retroplacental hematoma; and (c) direct expulsion of the placenta as a foreign body by uterine contractions. The recent investigations of Franz and, indeed, the views of most writers in general coincide with this theory, most of them emphasizing the importance of the disproportion created by the reduction of the area of attachment on the uterine wall.

Frankl argues against this conception of the causes of detachment. The roentgen studies of Weibel (and Warnekros) and the observations of Franz by palpation establish the fact that invariably the placenta is found completely separated immediately after the expulsion of the fetus. But this occurs even if a definite uterine contraction has not

followed the passing of the fetus, e. g., after instrumental delivery under deep narcosis. Theoretically, at least, one would be justified in challenging the belief of most writers that the placenta is so entirely incapable of adapting itself to such an assumed reduction in the area of attachment. As a matter of fact, the area of placental attachment is thinner than the rest of the uterine wall at the same level, and this thinned area does not participate in a uterine contraction as long as the placenta is attached. Therefore, it is impossible to assume that a uterine contraction causes the separation of the placenta. From histologic studies Frankl concludes that the loosening is effected by a rupture of the overdistended blood vessels in the spongiosa, and through destruction of the spongiosa septa by the escaping blood. The blood vessels rupture when an excessive amount of blood suddenly flows into the uterine wall as soon as the fetus is expelled from the uterine cavity.

**Hiess: The Normal Detachment of the Placenta.** Wiener klinische Wochenschrift, 1920, xxxiii, 927.

It has been believed that the detachment of the placenta is due to the uterine contractions which follow the birth of the fetus, and also to the diminishing size of the site of placental insertion. Frankl had observed that at times the placenta had separated without any palpable contraction of the uterus. Weibel, by x-ray examination, has shown that the placenta at the time of the birth of the fetus, and immediately after, is still attached to the uterine wall. Hiess has often followed the course of the last stage and like Frankl has observed detachment of the placenta without any apparent contraction of the uterus. At two cesarean sections he has been able to see the process of detachment. In both cases the placental site was on the posterior wall, in each case the placenta loosened, although the uterus was relaxed and soft. The uterine wall at the placental site was softer than at other places and this particular area did not contract until the placenta was completely separated.

When one considers the great vascularization of the uterus in the last months of pregnancy and takes into account the pressure exerted during labor which is so suddenly released by the birth of the fetus, one can easily understand, as maintained by Frankl, that the blood immediately gushes into the placental site and breaks the capillaries and septa of the spongiosa representing the point of least resistance. Hiess likens this occurrence to the bleeding following the evacuation of an overdistended bladder.

He draws a further analogy in the case of central placenta previa, in which the lower uterine segment is thinned out and soft, and though it does not contract, the placenta nearly always becomes spontaneously detached.

The author has tried compression of the aorta to see what effect that would have on the ablation of the placenta but believes that the blood apparently rushes into the placental site before the uterus becomes small enough to permit an effective compression of the aorta. Also there is an accessory circulation through the spermatie vessels which would allow blood to enter the uterine circulation.

FRANK A. PEMBERTON.

**Mceller: Is the Double Ligation of the Umbilical Cord Necessary or Advantageous?** Original in Swedish. Abstracted in *Gynaekologische Rundschau*, 1913, vii, 339.

In a series of 1300 labors the writer compared the results of ligating both ends of the severed cord in one-half of the cases, and leaving the placental end untied in the other half. His observations in regard to the expulsion of the placenta tend to show an advantage of single ligation of the fetal end of the cord. He concludes that the partial emptying of the placental blood through the open end of the cord shortens the third stage, by favoring the expulsion of the smaller placenta.

**Gabaston: A New Method of Artificial Detachment of the Placenta.** *Münchener medizinische Wochenschrift*, 1914, lxi, 651.

In a case of uterine atony with retention of the placenta, it occurred to the author, chief of the obstetric clinic in Buenos Aires, to inject a warm sterile saline solution into the umbilical vein. Seven minutes later the atonic uterus contracted, and within 12 minutes the placenta was expelled. He assumes that the fluid distended the chorionic villi and thus prompted the detachment. He expresses the hope that this new method will effectively obviate the necessity of ever resorting to manual removal of the retained placenta.

**Traugott: Saline Injection of the Placenta.** *Münchener medizinische Wochenschrift*, 1920, lxxvii, 1170.

The author divides abnormal delivery of the placenta into the type caused by anomalies of separation and the type caused by anomalies of expulsion of the secundines. Aside from the infrequently-met incarceration behind an abnormal contraction ring, or behind a prematurely closed cervix uteri, the last-named type finds its explanation in the physiologic muscle weakness of the lower uterine segment and vagina, and in faulty abdominal pressure.

The principal factor in the physiologic separation of the placenta, however, is the incongruity between the surface of the placenta and the area of its attachment. Any method that seeks to initiate or to supplement the physiologic separation of the placenta must exaggerate this difference in surface area. Massage of the uterus, uterine contractions, produced by organic or inorganic media, as well as Credé expression reduce the area of the placental site. Tying of the umbilical cord prevents a diminution in the volume of the placenta and thus facilitates its expulsion.

The method which most closely simulates the physiologic condition for spontaneous separation of the afterbirth is the injection of fluid into the placenta through the umbilical vein.

While several authors have substantiated Traugott's previous reports of successful use of this method it has not won the recognition that it deserves.

To facilitate the procedure and so broaden its scope of application the author has devised a simple and inexpensive instrumentarium. The only technical difficulty consists in the introduction of a cannula into the umbilical vein. The author proceeds as follows: The umbilical



cord is cut between two clamps or ties. With a hemostat the umbilical vein, easily recognized by its lumen, is grasped in such fashion that one arm lies within the lumen of the vein, the other on the amniotic surface of the cord. A spreading forceps is now inserted 1 to 2 cm. into the vein. The arms of this forceps are provided with notches on the external surface and curved in such manner as to facilitate the direct introduction of the cannula into the vein. The notches of the widely-opened forceps arms hold the cord, and the hemostat can be removed even while the cannula is being inserted. The cannula has an olive point, above which the cord is fixed about the cannula either with thread or the usual cord tie. Different sizes of cannulae are kept on hand. A glass stopcock, easily regulated by the thumb of the left hand in which it is held, is fitted snugly to the cannula. The other end of the stopcock is connected to a syringe by rubber tubing.

Through the filling of the placenta via the umbilical vein, which rarely requires more than 200 to 300 c.c., its surface becomes greatly enlarged, its weight increased by more than one-half in the case of the average placenta, weighing about 500 grams. This intrauterine irritation, which is strengthened by light massage of the uterus, pituitrin or quinine, initiates contractions which decrease the area of the placental site.

Traugott, while unwilling to accept Frankl's idea of placental detachment, admits that even such a condition would be in part reproduced by the filling of the placenta and the rupture of the chorionic vessels by the injected NaCl solution. To the retroplacental hematoma would be added the retroplacental hydroma.

Therefore, whichever view be accepted in regard to the mechanism of separation of the placenta, this method actually hastens the physiologic detachment.

The method of saline injection into the placenta, verified as practical and safe by five years of personal experience in clinic and in private practice, limits the indications for Credé expression and manual removal of the placenta to those few cases in which the saline injection has failed.

S. B. SOLHAUG.

**Schwarz: Hydraulic Expansion of the Placenta.** Zentralblatt fuer Gynaekologie, 1920, xlv, 217.

Schwarz has employed Gabaston's method successfully in 16 cases and praises the advantages of such a simple method of hastening placental separation. As the injected fluid distends the placenta, a change in the relation of the size of the placenta to the area of attachment is obtained, which corresponds to the change caused by the contraction of the uterus after expulsion of the fetus. The only difference is that this method increases the placenta, while in the normal mechanism the area of attachment is decreased. An additional advantage is the stimulation of uterine contractions by the injection, and the added weight of the placenta which helps to pull off the placenta. If necessary, the Credé expression can be made which proves more effective on the filled and large placenta. About 300 to 400 c.c. of solution are required to distend the placenta sufficiently.

**Borberg: Treatment of Placental Retention by Gabaston's Method.**  
*Gynecologie et Obstetrique*, 1920, i, 542.

Borberg reports most gratifying results with the injection of approximately 500 c.c. of sterile saline solution into the umbilical vein. Gabaston's method undoubtedly obviates the necessity of removing an adherent placenta with the hand, a procedure so much more dangerous than this injection.

In discussing this paper of Borberg, read before the Obstetric Society in Copenhagen, Hauch emphasizes that Gabaston's method may fail when the placenta is partially detached. Its particular advantage over manual removal of the placenta is most evident in infected cases.

**Sklavounos: Rapid Expulsion of the Placenta.** *Surgery, Gynecology and Obstetrics*, 1920, xxx, 168.

This author, professor of anatomy in Athens, Greece, in October, 1919, conceived the idea that placental ablation possibly could be hastened by injection of fluid into the omphalic vein. Before attempting the procedure on the living he made experiments with fresh placentas and ascertained that on an average 200 grams of water are required to fill the veins of the placenta. An amount of 250 grams would also fill the arteries. Then the procedure was tested in 60 obstetric cases. Sterile saline solution was injected immediately after the expulsion of the child, and whenever the technic was perfect, the placenta was spontaneously expelled within three to five minutes. The proper technic consists in cutting the cord near the vulva, to avoid obstacles from blood clots in the veins, to insert and fasten securely the cannula. Addition of 2 per cent sodium nitrate (presumably should read "sodium citrate." Editor.) to the injected fluid seems to overcome successfully all clot obstruction.

The factors which favor placental loosening by means of this procedure are: Increase in weight of placenta; swelling and erection of the villi; infiltration and rupture of the capillaries causing a retroplacental hydroma to form; and the temperature of the injected fluid which stimulates the uterus to contract. To the great advantage of the mother this procedure reduces the total blood loss.

In one case of placenta accreta, in which Credé expression had failed, the injection lead to the prompt expulsion of the placenta.

After having finished this paper Sklavounos discovered that almost a hundred years ago, in 1826, Mojon, a professor of anatomy in Genoa, Italy, had described a method of hastening placental detachment by the injection of cold fluid into the umbilical vein, and that this method of Mojon was mentioned and recommended already in Scaneoni's Text-book of Midwifery. (He remained unaware of the rediscovery of the identical method by Gabaston in 1914. Editor.)

**Keller: Artificial Detachment of the Placenta by Injection of Fluids in Veterinary Obstetrics.** *Zentralblatt fuer Gynaekologie*, 1919, xliii, 335.

Prompted by the wide discussion of this method in medical journals Keller reports that about 12 years ago he experimented with this identical procedure on cattle and horses, not aware of the fact at that time

that this method had been described by Mojon in 1828. Keller points out the differences in placental attachment in these animals and the human. In them the chorionic villi cannot be distended and the placental detachment is effected by the retention of the injected fluid behind the placenta. Nevertheless he tried the method in his veterinary work in view of the special disadvantages of manual removal of the placenta in cattle. He met with failure in the two cases of placenta accreta, and both ended disastrously. This was, in his opinion, due to the fact that the abnormal adherence was due to an infection with the Bang bacillus. The only field for this method in veterinary obstetrics is in the cases in which the retention is caused by a uterine atony.

**Baer, J. L.: Indirect Expulsion of the Placenta.** Journal American Medical Association, 1921, lxxvi, 566.

Feeling that direct pressure on the uterus may cause metritis, late hemorrhage, or rupture of a pus tube, Baer proposes the following method of expelling the detached placenta: After waiting half an hour, and assuming that the placenta is detached, the recti are drawn together by one or both hands placed transversely above the umbilicus and firmly held between thumb and fingers. During a pain, the parturient is asked to bear down. The recti thus acting more effectively the uterus is driven downward and the placenta expelled.

In the hands of himself and interns, this method proved successful in 90 per cent of his cases.

R. B. WOBUS.

**Warnekros: The Third Stage of Labor in Roentgenograms.** Archiv fuer Gynaekologie, 1918, cix, 266.

Abstracted in this JOURNAL, 1920, i, 319.

**Weibel: Study of the Third Stage of Labor in Roentgenograms.** Archiv fuer Gynaekologie, 1919, cxi, 413.

Abstracted in this JOURNAL, 1920, i, 319.



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## Necrology

Matthew D. Mann, M.D.,

1845—1921

ONCE more the grim reaper Death has called a distinguished member of our profession to his reward in the world to come. Matthew D. Mann, Emeritus Professor of Obstetrics and Gynecology in the University of Buffalo, died suddenly at his home on March 3rd of heart failure. He had been about his usual duties in the morning and had felt unusually well. Dr. Mann had retired from active practice some years ago but was able to enjoy the medical meetings and the association and activities of his friends and was busy in the many interests which had occupied much of his life—philanthropic, civic, and religious.

Dr. Mann was born in Utica in 1845, was graduated from Yale in 1847 and from the College of Physicians and Surgeons at Columbia, in 1871. He studied in Europe for two years, and on his return opened an office in New York, where he practiced until 1879. He then went to Hartford as a specialist in diseases of women. He served as a clinical lecturer in New York from 1880 to 1882.

In the year 1882 he was called to Buffalo as Professor of Obstetrics and Gynecology in the University of Buffalo and served as obstetrician and gynecologist in the Buffalo General Hospital and many of the other hospitals of the city during his active years of practice. He was President of the American Gynecological Society in 1894. Among his works as a writer, besides those which appeared from time to time in medical journals, are his "Manual of Prescription Writing," which appeared in 1879, and "The American Text Book of Gynecology."

Dr. Mann was always a vigorous, bold operator with good judgment and resourceful in his methods. Among his most distinguished patients was President McKinley, who was shot during the Pan-American Exposition, held in Buffalo in 1901. Dr. Park, who was the Surgeon-in-Chief of the Exposition, was in Niagara Falls when the shooting occurred and as the condition of the President was so alarming, Mr. John G. Milburn, President of the Pan-American Exposition, sent for Dr. Mann, who in company with Dr. Mynter, operated upon the martyred President.

Dr. Mann celebrated his fiftieth wedding anniversary on November 11, 1919. He is mourned by a wife, four sons and a daughter.

H. E. HAYD, M.D.

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## Original Communications

### THE PROBLEM OF EFFECTING STERILIZATION IN ASSOCIATION WITH VARIOUS OBSTETRICAL PROCEDURES\*

BY J. WHITRIDGE WILLIAMS, BALTIMORE, MD.

IN CASTING about for a subject which might interest you, I recalled that we had deliberately effected sterilization in association with some obstetrical procedure in forty-four out of the twenty odd thousand patients who had been admitted to the Obstetrical Service of the Johns Hopkins Hospital, and I thought that it might perhaps be profitable to discuss the indications which led to such a decision, and at the same time to obtain the opinion of the members of this Society as to their justification.

In 29 patients sterilization was effected in connection with some variety of cesarean section, which in great part had been undertaken on account of disproportion incident to contracted pelvis, while in the remaining 15 it was effected earlier in pregnancy.

The 29 sterilizations at the time of labor may be divided as follows: 18 were associated with supravaginal hysterectomy, 14 of which were done at a second or third cesarean section performed on account of contracted pelvis, and four on account of the existence of serious disease. In 11 other patients sterilization was effected following cesarean section for various causes, but mostly for contracted pelvis, by doubly ligating the tubes and burying the uterine ends between the folds of the broad ligaments. The remaining 15 operations were done during the course of pregnancy, and were as follows: 6 supravaginal hysterectomies, and 9 hysterotomies followed by tubal sterilization for various diseases complicating pregnancy.

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\*Read before the Obstetrical Society of Philadelphia, December 2, 1920.

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

I shall consider each group separately, particularly from the point of view of the indication for the operation and the technic, but before doing so, I shall discuss briefly the various methods by which sterilization may be effected. In general these are divided into four great groups: 1, operations upon the ovaries; 2, operations upon the uterus; 3, operations upon the tubes, and 4, the employment of x-rays or radium.

Naturally, castration was the first method to be considered, for the reason that the occurrence of pregnancy would be impossible if ova could no longer mature and be cast off. Gradually, however, as the fundamental importance of the internal secretory function of the ovaries to the entire economy became recognized, as well as the fact that serious symptoms are sometimes associated with premature menopause, this method was abandoned, so that at present no one advocates the removal of the ovaries except in the presence of definite and serious disease. Furthermore, the attempt to produce sterility following cesarean section by such means is associated with another danger, namely that as the uterus undergoes involution the pedicles may be subjected to marked strain with the result that even tightly tied ligatures may slip and the patient succumb to secondary hemorrhage unless prompt operative aid is at hand.

In order to avoid the undesirable consequences which may follow the removal of the ovaries, Pana, Taddei, Bucura, Blumberg and others, have advocated burying them between the folds of the broad ligament, or so covering them by peritoneum as to make impossible the escape of eggs. While such proposals are of interest on account of their ingenuity, they have not as far as I know been put into practice.

Turning to the uterus, G. P. Michealis, early in the last century, was the first to suggest that the recurrence of pregnancy in women requiring cesarean section could be best obviated by removing that organ. This suggestion, however, was not acted upon until many years later; although it is interesting to note that Blundell made a similar suggestion in the 1834 edition of his *Principles and Practise of Obstetrics*. In discussing cesarean section he devoted a page to the consideration of the "entire removal of the uterus," and, among other things, said "In speculative moments I have sometimes felt inclined to persuade myself that the dangers of the cesarean operation might, perhaps, be considerably diminished by the total removal of the uterus." That his suggestion was not based upon theoretical speculation is shown by the fact that he attempted the operation upon four rabbits at the end of pregnancy, and after amputating both horns, stitched the uterine stump into the lower angle of the abdominal wound. As three of the animals recovered, he demonstrated the feasi-



bility of the procedure, and became the forerunner of Porro, who did not attempt this operation upon the living woman until 1877.

It is unnecessary before this assembly to consider what Porro's operation meant when first described, and many of us can remember the unsightly indrawn cicatrices which followed it. As time went on Porro's operation fell into desuetude, and was gradually replaced by supravaginal amputation of the uterus with retroperitoneal treatment of the stump, with whose advantages we are so familiar. With the development of the latter operation, as well as of similar procedures for the removal of the myomatous uterus, it was soon recognized that such a technic would offer a satisfactory means of effecting sterilization in nonpregnant women, as well as for removing the early pregnant uterus.

As our knowledge concerning the internal secretory functions of the internal genitalia became better established, many came to believe that the uterus shares in the function, and therefore should not be sacrificed lightly. Consequently supravaginal amputation of the uterus is little used for the prime purpose of producing sterilization, and its employment is generally limited to such cases as present a definite lesion of the organ; although Winter has recommended it as the method *par excellence* when moderately advanced tuberculosis is the indication for interference.

Passing to a consideration of the tubes, Blumberg stated that Blundell, at a meeting of the Medico-Chirurgical Society of London in May, 1819, was the first to suggest the possibility of effecting sterilization following cesarean section by applying ligatures to the tubes. He was however in error; for, while Blundell did read a paper at that time, it was not upon that subject, but had for its title—"Experiments on a few controverted points respecting the physiology of generation," and dealt with the question as to whether direct contact between the spermatozoon and ovum was necessary for conception. The first utterance of Blundell concerning ligating the tubes for the purpose of preventing conception, was made in his textbook, from which I quote the following lines:—"before closing the abdomen, the operator, I conceive, ought to remove a portion, say one line, of the fallopian tube, right or left, so as to intercept its calibre." As if conscious of what the future would bring forth, he stated that while mere division of the tube might be all that is necessary, resection of a portion of it would be more efficient.

Actual tubal sterilization, however, was not attempted until 1880 when Lungren, of Toledo, Ohio, at a second cesarean section tied both tubes with ligatures one inch from their uterine insertions, in the hope of preventing the necessity for a third operation. It is interesting to note that he had an idea that such interference might influence the menstrual function; as, in a footnote, he stated that the patient menstruated at

monthly intervals afterwards, thus demonstrating that ligation of the tubes had no effect upon it. From that time until 1897 the attempt to effect sterilization by procedures upon the fallopian tubes was limited to cesarean section, and Nürnberger has collected 42 such operations performed prior to that date. In most instances, the tubes were merely ligated, but occasionally they were cut between two ligatures, and very exceptionally a portion was excised. In the 42 cases two failures were noted. The first being reported by Falaschi, who had ligated both tubes following a cesarean section without result, and as the patient soon afterwards became pregnant he was obliged to resort to a second section within a year. Zweifel's failure was even more remarkable, as, in order to effect sterilization after a cesarean section, he doubly ligated both tubes and severed them between the ligatures. The patient shortly afterwards became pregnant, and when he did a second section in 1894 he found that the cut ends of either tube had become reunited and that the ligatures had disappeared.

Up to 1897, the attempt to effect sterilization by operations upon the tubes was attempted solely after cesarean section in the hope of preventing the necessity for a second operation, but following Kehrer's paper in that year, the operation became popularized, and was extensively employed in nonpregnant women, either as an independent procedure, or in combination with other operations. The latter indication was greatly exploited in Germany, and a clear idea of the extent to which it was abused can be obtained from Offergeld's paper which appeared in 1910.

The entire subject of tubal sterilization was exhaustively reviewed in 1917 by Nürnberger, and in 1919 by Zimmermann. The former described and considered more or less critically thirty-six methods by which it had been recommended for that purpose. These consisted in ligation, section between two ligatures, resection, excision, implantation of the tubal stump in the inguinal canal or in the vagina, extraperitonealization, etc. He referred especially to the experimental work of Fraenkel which showed how difficult it was to effect sterilization in rabbits by operations upon the tubes, and completed his article by a report upon three cases, observed in Doederlin's clinic, in which pregnancy had occurred after ligation of the tubes. Both Nürnberger and Zimmermann studied microscopically the conditions produced by ligation, and came to the conclusion that it was extremely difficult to effect sterilization by operative procedures upon the tube, except by excision of the entire structure, or at least by the wedge-shaped excision of its proximal end at the uterine cornu, followed by the most careful suturing of the wound.

I shall not attempt to consider in any detail the efforts to produce sterilization by use of the x-ray or by radium, as I have had no experience with either method, but particularly for the reason that unless the function of the ovary is destroyed, positive results cannot be in-

sured, and if it is, all the disadvantages incident to castration are associated with the method.

Returning to the consideration of our own cases, I find that in a series of 58 supravaginal hysterectomies following cesarean section, the body of the uterus was amputated in 18 instances primarily for the purpose of effecting sterilization, an incidence of 30 per cent. Naturally, sterilization was likewise effected in the other 40 patients, but in them it was only incidental to the operative procedure, as the indication for the removal of the uterus was offered by various causes, such as intrapartum infection, the presence of myomata, injuries to the uterus, extensive raw areas resulting from the separation of adhesions, disorganization of the uterine muscle by hemorrhage associated with premature separation of the normally implanted placenta, atresia of the cervix and other conditions.

In 14 of the 18 patients in whom sterilization was effected marked degrees of pelvic contraction afforded the primary indication for the cesarean section; while in the other four the pelvis was normal and the operation and subsequent sterilization was indicated by some disease which seriously threatened the life of the patient. For many years it was my tendency to remove the uterus at the second cesarean section, partly for the purpose of doing away with the necessity for its repetition, but in great part on account of the more satisfactory convalescence which follows supravaginal amputation. But more recently, with the gradual improvement in the results of conservative cesarean section, which in great part are due to the more careful selection of the patients submitted to it, I have done fewer amputations; although I must confess that on account of its more favorable prognosis I resort to the procedure whenever I can find a reasonable justification for it.

Upon analyzing the 14 cases in which sterilization was effected by supravaginal amputation of the uterus incident to contracted pelvis, I find that in no instance was it done at a first labor, as is shown by the following enumeration:

- 1 was done at a first cesarean section following a pubiotomy,
- 1 at a first cesarean section which had been preceded by two pubiotomies,
- 7 at a second cesarean section,
- 1 at a second cesarean section preceded by a pubiotomy,
- 3 at a third cesarean section,
- 1 at a third cesarean section preceded by a pubiotomy.

In each instance, except the first and another in the third group, the operation was performed either at the urgent request of the patient or because I felt that her obstetrical experience had been sufficiently extensive. In the first case referred to, in addition to the generally contracted rachitic pelvis, which was the cause for the first intervention, the real indication for sterilization was the fact that following the first pregnancy the patient had developed an aortic insufficiency.



which had resulted in frequent attacks of decompensation, so that when she came to a second section three years later, I felt justified in removing the uterus. In the other case, the first cesarean had been done elsewhere, and had been followed by a febrile convalescence, so that the patient had been discharged with a fistula extending from the uterine cavity to the abdominal wound, through which blood escaped at each menstrual period. Afterwards, in our Surgical Department, the fistulous tract was excised together with a considerable portion of the anterior uterine wall which contained a number of silk sutures. Consequently, when I came to do the second section, the uterus was removed with the idea that its wall had probably been so weakened that rupture might occur in a subsequent pregnancy. Subsequent histological examination, however, showed that such fears were not justified, as no trace of the cicatrix could be found.

Deducting these two cases, 12 others are left. In six of them sterility was effected at the urgent request of the patient and her husband; whereas in the other six the uterus was removed on my initiative, twice at the second section, three times at a third section, and once following a third section, which had been preceded by a pubiotomy.

In four other instances the uterus was removed at my initiative on account of the existence of disease which placed the life of the patient in immediate jeopardy and promised to do so again whenever she might become pregnant in the future. In three of the patients the indication was heart disease, and in the fourth chronic nephritis.

A brief summary of the histories of these patients will serve to indicate that so radical a procedure was justifiable.

H. 5709, generally contracted pelvis. Acute endocarditis, aortic and mitral insufficiency with broken compensation. As no improvement followed one week's treatment in the hospital, operation was undertaken.

H. 7705, the patient, pregnant for the third time, had suffered for years with mitral stenosis and insufficiency, and entered the hospital with a marked break in compensation. She was put to bed and treated medically for seven weeks. As no improvement followed, the uterus was removed before the onset of labor.

H. 7832, the patient, pregnant for the second time, had suffered for years from mitral stenosis and insufficiency. She entered the hospital with marked myocardial insufficiency, and after being in bed for 19 days fell in labor. Operation was immediately undertaken with the view of sparing her heart from the strain of labor.

The fourth patient, H, 9115, came to us in her third pregnancy with a history of having had a cesarean section elsewhere on account of eclampsia during the second pregnancy. Investigation showed that she was suffering from an exacerbation of a chronic nephritis and presented a blood pressure of 270, eight grams of albumen in the urine, and an albuminuric retinitis. It was attempted to induce labor by the introduction of a bougie, but no pains resulted during the following 24 hours. In the meantime uremic convulsions set in, and as the cervix was still rigid and an elevation of temperature indicated beginning intrapartum infection, conservative section did not seem indicated. Accordingly supravaginal amputation was done and the patient recovered after a febrile convalescence. The justifiability of the interference was indicated by the fact that the temperature rose to 103.4° F. during the

puerperium, so that in all probability death from peritonitis would have resulted had conservative section been done.

While the ultimate results in all the cases here reported were satisfactory, and indeed we have only lost one supravaginal amputation in a series of 58, we have gradually come to feel that we had perhaps been too free with our indications for so radical a procedure. Consequently, in recent years when we faced the necessity for sterilization, we have attempted to effect it by more conservative means, and in a certain proportion of our cases we have done so by doubly ligating the tubes, opening up the broad ligaments and burying within them the uterine end of each tube.

In this manner we have treated 11 patients who may be classified as follows:

- (A) 2 with tubal sterilization at the first section,
- (B) 4 with tubal sterilization at the second section,
- (C) 2 with tubal sterilization at the second section preceded by a pubiotomy,
- (D) 3 with tubal sterilization at the third section.

The six patients in Groups B and C were sterilized at their urgent request; while those in Group D were sterilized at my instigation, as I feel that women who had submitted to three sections may be assumed to have done their reasonable duty to the State. The two cases in Group "A" however, deserve further consideration, as in them the indications for sterilization were somewhat peculiar:

H. 8196. The patient had a simple flat pelvis with a diagonal conjugate of 10 cm. and had been delivered elsewhere of two dead children. She came to us for a cesarean section at the end of the third pregnancy. She urgently requested that she be sterilized, as she had married a widower with five children and felt that with her own newly born child she could not face a larger family.

H. 10579. An elderly primipara who had long suffered from chronic nephritis. On admission she presented a blood pressure of 210, seven grams of albumin in the urine, an albuminuric retinitis, hypertrophy of the heart and a phthalein output of 29 per cent. In view of these conditions and the probability that the disease would be accentuated in future pregnancies, I felt that sterilization was indicated. Further study during the puerperium justified our decision, as her blood plasma showed an extraordinary increase of nonprotein nitrogen, uric acid and urea on the third, fourth and fifth days postpartum, while on discharge she presented typical symptoms of chronic nephritis.

As far as I can see sterilization was justifiable in each of the 29 cases just mentioned, except perhaps in several of the women in whom it was effected at the second uncomplicated cesarean section. In view of the steady improvement in the results following that operation I am inclined to believe that at present routine sterilization at a second section is too radical, and is indicated only in special circumstances. I still hold, however, that the procedure is justified at the third section, and in such cases, I allow the inclination of the patient to influence me as to whether I effect sterilization by removal of the uterus or by bury-

ing the uterine ends of the tubes between the folds of the broad ligament. In such cases, I inquire whether she wishes to menstruate afterwards or not. If she replies in the affirmative, I effect tubal sterilization, otherwise I remove the uterus. My reason for continuing to resort to the more radical operation is that the convalescence following it is in general much smoother than after conservative section, as well as for the fact that it is sometimes difficult to bury the ends of the tubes satisfactorily on account of the very delicate structure of the upper part of the broad ligaments, and in attempting to spread them apart the tissues may be so torn that it becomes necessary to excise the cornual end of the tube by a wedge-shaped incision. Furthermore, as all of the women under consideration were hospital patients, and many of them of a low order of intelligence, the operation seems still further justifiable, more particularly as six of the seven women who were sterilized at the third section were negroes.

Passing on to the second group of cases in which sterilization was effected during pregnancy, we find that in them there was a vital necessity for its interruption on account of the existence of incurable or progressive disease. In all of the patients in this group it was evident that the pregnancy should not be allowed to continue, and, that further pregnancies should not be allowed to occur.

Among the more intelligent classes, advice concerning abstention from intercourse, or concerning its regulation, may be followed; but in the type of hospital patients under consideration we know that such advice would not be followed, so that the occurrence of future pregnancy can be insured only by operative sterilization.

For this purpose three methods are at our disposal.—

(a) Supravaginal hysterectomy with the removal of the unopened pregnant uterus.

(b) Opening the uterus by means of a small fundal incision and evacuating its contents, followed by double ligation of each tube and the burial of the uterine ends between the folds of the broad ligaments.

(c) Induction of abortion by the vaginal route followed by operative sterilization at a later time.

The latter method I have not employed, as I have thought it quite as conservative, and certainly more economical of the patient's time, to complete the entire operation at one sitting.

In such circumstances we have performed six supravaginal hysterectomies and nine hysterotomies followed by tubal sterilization. Concerning the former it may be profitable to discuss briefly the justification of our decision to remove the uterus. In two instances the procedure was adopted for heart disease, in three for chronic nephritis and in the last on account of advancing tuberculosis. Abstracts of the histories are as follows:



H. 7870. The twenty-seven-year-old patient with 4 live children, had suffered for years from progressive mitral stenosis and insufficiency. She has suffered repeatedly from decompensation, and was admitted to the hospital with signs of acute decompensation as well as with tuberculosis and syphilis. As no improvement followed two weeks' rest in bed associated with suitable treatment, the six months pregnant uterus was removed unopened, and the patient was discharged in unexpectedly good condition.

H. 9649. The thirty-one-year-old patient with 3 living children, had suffered from mitral insufficiency for 15 years, and was admitted to the hospital with marked decompensation. After a medical consultation it was decided that it would be inadvisable to allow the pregnancy to continue, and accordingly the unopened uterus was removed at the third month.

In the next three patients, the indication for interference was chronic nephritis. Each of the women had from one to seven living children, presented a history of previous nephritic trouble, and was admitted to the hospital with high blood pressure, albumin and casts, and with albuminuric retinitis. In each instance the unopened pregnant uterus was removed at periods varying from the second to the sixth month. The operations were technically easy, and the patients were eventually discharged with the underlying disease still persisting.

H. 7682, the forty-two-year-old patient, with 4 living children, had suffered from tuberculosis for years, was admitted at the tenth week of pregnancy with a subacute process. After consultation with a competent specialist, it was determined that the pregnancy should be interrupted, and as the patient was anxious to prevent any possibility of conception in the future, as well as to cease menstruating, the uterus was amputated. Such an indication has received unqualified endorsement from Winter in his excellent recent book, and in this case radical treatment seemed preferable to more conservative procedures.

In the second group are nine patients in whom sterilization was effected during pregnancy by means of abdominal hysterotomy followed by ligation or excision of the tubes. In one of them, H. 9637, the indication was mitral insufficiency with a history of repeated decompensation. In three others tuberculosis afforded the indication for interference (H. 6858, H. 7283 and H. 7489). In each instance the diagnosis, as well as the necessity for interference, was confirmed by a competent tuberculosis specialist. The duration of pregnancy varied from the sixth to the twelfth week of pregnancy.

In the next four cases the indication was afforded by chronic nephritis (H. 6926, H. 8718, H. 10789 and H. 10810). These patients were multiparæ, who had presented a history of nephritic disturbance in previous pregnancies, and all of them entered the service with manifestations of serious present disease, as indicated by a blood pressure varying from 200 to 290, as well as other symptoms indicative of underlying chronic nephritis. In each instance it was felt that pregnancy should not be allowed to continue, and as there was no probability that the condition could be cured, and every likelihood that it would become accentuated in the future, it was determined that the occurrence of future pregnancies should be rendered impossible.

The last case of the series (H. 10344), was of considerable interest, in that it offered an unusual indication for interference. The 36

year old patient with 5 living children had her right kidney removed in 1916 for indications which we were unable to ascertain. She was admitted to the hospital in the tenth week of her sixth pregnancy with signs of advanced chronic nephritis. In this instance interference seemed more urgently indicated than in those just described, as it was felt that fewer chances should be taken in the presence of only a single diseased kidney. Accordingly, the uterus was evacuated by abdominal hysterotomy, the tubes doubly ligated and their uterine ends buried between the folds of the broad ligaments. On discharge she still presented symptoms indicating that, while the interference had probably prevented further trouble, it had in no way affected the underlying disease.

In my opinion careful consideration of the 15 cases just mentioned indicates that the treatment pursued was not only rational, but in reality, conservative; as it has always seemed to me that one of the opprobria of medicine is to terminate pregnancy for some reason and to advise the patient not to become pregnant again, and at the same time be morally certain that within a few months she will return in the same condition. In patients of this type, who are suffering from an incurable disease, which is certain to undergo exacerbation during another pregnancy, I feel that the most conservative procedure is to do away with the possibility of its recurrence. Accordingly, in such cases, I place the matter plainly before the patient and inquire whether she desires to menstruate or not in the future. If she answers in the affirmative, we terminate the pregnancy by abdominal hysterotomy and follow it by resection of the tubes and the burial of their uterine ends in the broad ligaments; but if the reply is in the negative we remove the uterus unopened.

I incline to the more radical procedure for the reasons given when cesarean section followed by supravaginal amputation of the uterus was considered, and retain the tubes and ovaries for their internal secretory function. Subsequent investigation of the patients who have been so treated has revealed no deleterious results.

It may be asked why we bury the uterine ends of the tubes between the folds of the broad ligament following hysterotomy, and why we do not rely upon resection alone. The reasons have in part already been given, and I can never forget seeing Zweifel's patient in whom at the second cesarean section in 1894 both tubes were found to be normal and patulous after he had doubly ligated and severed them at the first section in order to prevent conception.

The work of Nürnberger and Zimmermann has afforded abundant evidence that nothing but the most radical operations upon the tubes can be relied upon to effect sterilization, and most of such operations have not appealed to me for use in pregnant women. Recently Madlener has reported that sterilization can be readily effected by crushing

the tube by means of compression forceps, and he has reported that in 86 cases so treated there had been no recurrence of pregnancy. Whether the future will bear out his assertions is not certain, but in view of the demonstrated tendency of Nature to restore the lumen of the tube after operative procedures, I am doubtful as to the ultimate outcome.

Whether the method we have pursued, will be universally satisfactory, I am not prepared to state. As yet none of the women whose tubes we have resected and buried have again become pregnant, but the number of cases is too small to justify sweeping conclusions, more particularly when we recall that in Nürnberger's statistics, only one woman in twenty became pregnant following the various operative procedures which he described.

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## SUBMUCOUS ADENOMYOMA\*

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ACCORDING to Cullen's classification of uterine adenomyomata, these tumors are divided into three types; namely, the diffuse adenomyoma of the uterine wall, the subserous, and submucous variety. The diffuse adenomyomata are surprisingly common, and this fact is particularly appreciated by those who, as a routine procedure, study microscopically uteri removed at operation. Subserous nodules of any considerable size are by no means common, but small subserous adenomyomata in the vicinity of the uterine 'horns' are seen not infrequently. The submucous variety, however, is quite rare, particularly those tumors which attain any considerable size. Recently after encountering a very remarkable case of this type and after studying the literature, I was surprised to find that with the exception of Cullen, the subject has been given very little attention.

Cullen, in 1897, in one of his earliest articles on adenomyoma described a small polyp springing from the anterior wall just above the level of the internal os. The body of the polyp was the size of a hazelnut and was composed of smooth muscle tissue penetrated by uterine glands. In discussing the subsequent changes which may occur in diffuse adenomyoma of the uterine body, he again mentions his case of small submucous adenomyoma and also describes the cases of Schatz and Diesterweg reported in 1884 and 1883 respectively.

In Schatz's case the uterus was 16 cm. long, 8.5 cm. wide in diameter, the wall varying from 2 to 2.5 cm. in thickness. The entire cavity contained five rows of broad base polypi. Each row consisted of from two to six polypi, varying from the size of a pea to a hen's egg, and the uterine cavity was completely filled with them. The polypi were made up of muscle tissue and glands which were embedded in a tissue made up of spindle-shaped cells. The glands were lined by a single layer of cylindrical cells, and where there was some dilatation of the glands the epithelium was definitely of a cuboidal type. Many small myomata were present in the uterine wall which were not easily shelled out. Those near the interior cavity showed some cystic dilatation. Cullen states that it would appear that in this case there had been a diffuse adenomyoma and the uterus was trying to free itself of the new

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growth in the same manner that it extrudes an ordinary myoma, accordingly the polypoid condition would naturally result.

In Diesterweg's case there was a nodule the size of a hen's egg with a pedicle one inch thick springing from the uterine cavity. The walls were 1.5 inch in thickness and its center occupied by a large cavity. The inner surface presented numerous small depressions giving an appearance resembling a ventricle. There was also a smaller cavity the size of a cherry. The walls presented a typical appearance of fibromyoma and the cavities were lined by cylindrical ciliated epithelium. They were filled with brownish-black blood. Two years later another submucous tumor, 9x7x6 cm., was removed from the same uterus. It was composed of myomatous tissue and contained a cyst the size of a walnut. The cyst was lined by cylindrical ciliated epithelium and filled with blood.

After describing these tumors and assuming that these cases belong to the same type as he described, Cullen pictures three stages: (1) The diffuse adenomyoma; (2) the polypoid stage; and (3) the gradual expulsion of the polypi. He further states that we know uterine myomata usually commence in the interstitial layers of the uterus and in time pass inward toward the uterine cavity or outward toward the peritoneal surface. He feels that in the diffuse adenomyoma of the uterine wall it is equally probable that portions of the growth will in time be separated and forced toward the peritoneal surface. In 1909, in his monograph on adenomyoma, Cullen divides uterine adenomyomata as follows: (1) Adenomyomata, the uterus preserving a relatively normal contour; (2) superitoneal or intraligamentary adenomyomata; and (3) submucous adenomyomata. He states that submucous adenomyomatous tumors are certainly not very common. He describes four cases of his own. Three of these were quite remarkable; in one of them a submucous tumor was removed, vaginally; it was a case of double vagina and cervix; the tumor was 11x7x7 cm. in size and diameter, and was well within the uterine cavity. In another case, a globular mass filled the entire vagina, projecting from the cervical canal, and was attached to the uterine wall by a small pedicle. The tumor was bisected and removed by ligating its pedicle. The third case was the most remarkable of all. The specimen consisted of the entire uterus with a large tumor projecting into the uterine cavity, filling it entirely, and extending through the uterine wall to the right and posteriorly, and extending between the layers of the broad ligament. The submucous portion measured 7 cm.x 6 cm., while the intraligamentary portion was approximately 10 cm. in diameter. Outside of the tumor area the myometrium showed no evidence of adenomyoma. Histologically these tumors were all made up of a myomatous matrix with dilated spaces lined by cylindrical epithelium; some of the cavi-

ties appeared as miniature uterine cavities. Many of them were filled with clotted blood. With the exception of reporting the additional cases, which to my mind clearly illustrate the author's assumptions made concerning these tumors in 1897, Cullen apparently had nothing further to add concerning these tumors.

Lockyer, 1918, in his monograph, in which he deals with adenomyoma most extensively, mentions submucous adenomyoma. He does not feel that small polypi, containing uterine glands and muscle tissue, should be classified as adenomyoma, but states with the large sessile submucous growths it is a different matter. He describes and illustrates a very interesting case of his own which was removed by Armand Routh. The uterus was removed by vaginal hysterectomy in two pieces, having been divided at the internal os. The entire uterus measured five and one-half by three inches; at the internal os the cavity was divided into two canals, a projecting adenomyomatous cystic growth dividing the cavity; the growth penetrated the uterine wall to the tubal angles. The point of discussion in this case was whether they were dealing with a submucous and subserous sessile growth, or whether the adenomyoma arose in a septate uterus. These submucous adenomyomata, as we have seen, are comparatively rare. This, indeed, is in marked contrast to ordinary discrete uterine myomata. The latter are commonly seen in all stages from an early submucous tumor to one that has been entirely expelled from the uterine cavity.

The infrequency of submucous adenomyoma, I think, can be readily explained. In case of diffuse adenomyoma of the uterus, the lesion involves the uterine wall in a very general way; the muscular hyperplasia of the wall with penetrating islands of uterine mucosa usually involves a greater portion of the uterine wall. Even if the involvement is not complete it is most difficult to separate the abnormal from the normal wall. Therefore, on account of the completeness of lesion in many instances, very little normal uterine wall remaining, and also in those cases which are less extensive, where there is such an intimate relation between normal and abnormal tissue, it is exceedingly difficult for the remaining normal tissue to expel the adenomyoma into the uterine cavity. The diffuse adenomyoma of the uterine wall is frequently associated with discrete myomatous nodules, and under such circumstances the discrete nodules more readily become submucous.

This markedly diffuse character of the growth is strikingly brought out when studying Cullen's 56 cases of diffuse adenomyoma reported in his monograph. The first illustration in his book, however, shows a diffuse adenomyoma which is definitely localized in the uterine wall and shows a distinct tendency toward becoming submucous. I have included the illustration in my paper to bring out this point and to contrast it with the case I am about to describe. One can readily con-



ceive how this tumor could be pushed into the uterine cavity, there being at least three-fourths of the normal uterine wall present to expel it.

Another factor, which must be considered when discussing the infrequency of submucous adenomyoma, is purely a clinical one. It is to be remembered that diffuse adenomyoma of the uterine body usually causes very marked clinical manifestations chiefly in the form of profuse and prolonged menstruation with a marked dysmenorrhea. Therefore it is quite logical to assume that the patient presents herself comparatively early, at least long before the lesion develops into the submucous variety.

My experience with submucous adenomyomata is limited to three cases, two of which were small polypoid masses, both about the size of a hen's egg and connected by a pedicle to the uterine wall. These are of interest, however, both on account of their size and on account of the fact that the uterus was not removed subsequently.

The third case is a most remarkable specimen. I wish to place this on record for several reasons: first, on account of its enormous size; second, because it clearly substantiates all of Cullen's ideas as regards the origin of these tumors; third, because it has most unusual characteristics, there being only one tumor in the literature, so far as I know, which has a similar structure, a case of large bilobed subserous tumor described by Robert Meyer; and fourth, because Meyer regarded his case as arising from the Wolffian duct or the epoöphoron, while the tumor in my case is clearly one of Muellerian origin.

#### CASE REPORT

Clinical history: Patient, married, forty-four years of age, entered Barnes Hospital complaining of a continual bloody vaginal discharge. Her family history and past history are unimportant. Patient had had no previous operations. Menstrual history began at the age of thirteen, twenty-eight to thirty day type; no pain or clots; of three days' duration, moderate in amount. Last period May 20, lasted three days. No disturbance until beginning of present illness. Married twenty-four years; no pregnancies; husband living and well. Present illness: About seven or eight years ago patient began to have pain during the menstrual period. The pain has become progressively worse; during the last two periods the pain was so severe that the patient was compelled to go to bed for three days. About six years ago she began to have a slight bloody discharge between the periods, and menstruation being more profuse and occasionally prolonged. At first the irregular intermenstrual flow was only enough to slightly soil the clothes and would come and go; at present the flow is almost constant, there being only an occasional intermission; the flow is never profuse, however, nor is there any pain during this time.

General physical examination negative. Abdominal examination: A mass, the size of a large orange, present in the left lower abdominal quadrant; freely movable, firm, more or less globular, arises from and is, apparently, attached to some pelvic structure. On vaginal examination a large globular mass is found filling the entire pelvic cavity. The vaginal portion of the cervix is flattened out and the external os is rounded and dilated about 1 cm. Its margins are about 4 mm. thick;

the cervical canal being almost entirely obliterated. On palpation through the cervical external os a large, soft, rounded mass is felt. This mass is a submucous tumor of some sort, distending the entire uterine cavity.

Diagnosis: Subserous and submucous myomata of the uterus. Recommended a panhysterectomy. Hemoglobin 70 per cent; other laboratory findings, negative.

Operation: Panhysterectomy; midline incision from symphysis to umbilicus. The uterine body is globular and about the size of an average man's fist. The fundus came directly into the incision, and the uterine body was readily delivered through it. Both adnexa were negative. Filling the pelvis and the entire cervical canal was a large mass about 12 cm. in diameter and firmly fixed in the pelvic cavity. On account of its size it was immovable even after freeing the bladder and severing the broad ligaments down to the uterine arteries. The body of the uterus was amputated at the level of the reflexion of the peritoneum anteriorly. After amputation it was noticed that the uterine wall on the left side contained a coarse, infiltrating growth from within outward, penetrating about one-half the thickness of the uterine wall. This infiltrated area marked the upper attachment of the pelvic tumor. The anterior and posterior walls were now incised from above downwards for the distance of about 6 cm., when the tumor was found to be attached by a broad base along the upper left and posterior portions of the dilated lower uterine cuff. The anterior wall was only slightly involved in the attachment of the tumor. The tumor was then separated from its attachment by dissection with the finger, leaving a grayish yellow area of about 6 cm., similar to the infiltrating tissue described above. After considerable difficulty the cervix was completely removed and the operation finished in the usual manner.

Gross description of the tumor: The specimen consists of three pieces; the body of the uterus with a submucous myoma, the lower submucous tumor, and the large cervical cuff. The body of the uterus measured 9 x 7 x 6 cm. and presented two myomatous nodules; one, a submucous affair sessile in character, 6 cm. in diameter, and filling the upper uterine cavity; another, an intramural capsulated myoma in the posterior wall, 4 cm. in diameter. With these exceptions the uterine wall showed nothing unusual and in its thickest portion measured 24 mm. including the mucosa, which was normal. At the lower portion on the left side, where the uterus was amputated at the time of the operation, was an infiltrated grayish area perforated by numerous minute cystic cavities. This area extends 1 cm. upward, 15 cm. into the uterine wall, and 2 cm. along the surface. It represented the upper portion of the attachment of the lower tumor, and in no other portion of the uterine wall, except below in the removed uterine cuff over an area of about 4 cm., corresponding to remaining attachment of the tumor, is this infiltration process seen. The cervical cuff, which was markedly thinned out, showed a comparatively smooth inner lining, the wall varying from 5 to 7 mm. in thickness. With the exception of the above-mentioned area, which was continuous with the infiltrated area described in the uterine wall, no involvement of this portion of the uterus could be made out. The infiltration process involved the wall similar to the attachment in the upper specimen, but the walls were infiltrated less deeply as the lower attachment of the tumor was approached. At no place did it go through the entire thickness of the uterine wall; in other words, the external surface over the entire lower uterine cuff was uninvolved. The tubes and ovaries were both normal and showed nothing unusual in the gross examination.

The lower submucous tumor measures 11.5 x 7.5 cm. It is irregular in outline, has an uneven surface, and is covered over its lower and right lateral surface by numerous cystic projections. The area by which the tumor was attached measured 6 cm. in diameter, was grayish yellow in color, very firm and similar to infiltrative tissue in

uterine wall. This former attached surface was rather ragged, owing to its separation from the uterine wall at the time of operation. The posterior surface presented numerous cystic areas, and also over an irregular area, about  $5 \times 2.5 \times 3$  cm., the surface presented numerous capillary excrecences; these vary in size from a fraction of 1 mm. to 4 mm. in diameter, and are raised from the surface from a fraction of 1 mm. to 1.5 cm. in height.

The tumor was then sectioned through its attachment in the anteroposterior direction. It was made up of comparatively solid tissue, perforated by innumerable open spaces varying from a pin point to 1.5 cm. in diameter. Several of the larger cavities presented marked intracystic papillary projections; in some instances these filled almost the entire cavities. These papillary projections are identical in appearance to those found on the outer surface; they are grayish-yellow in color and have a firm consistency. The lower portion of the tumor, particularly the lower third, is almost entirely cystic; the cysts are unusually large, have a very smooth lining, are filled with a clear gelatinous substance and contain very thin, paper-like septa separating one cyst from the other. The gelatinous material above mentioned is clear in all but one cyst in which there has been evidently a hemorrhage which gave it a light chocolate brown color. These cystic cavities vary from 0.5 cm. to 3 cm. in diameter and are of varying length, the largest being 5 cm.

*Microscopic Description.*—A section taken from the base of the tumor was composed essentially of muscular tissue and glandular elements. The glands were lined by a single layer of cells which varied in height from a columnar cell to a low cuboidal cell according to the amount of gland dilatation. The contour of the gland lumen was quite varied, there being all sorts of irregular shapes, many of which showed marked projections into the lumen of the gland giving a picture not unlike that observed in cases of intracanalicular adenofibroma of the breast. These glands, of various sizes, are so numerous that they fairly riddle the muscular matrix. In many instances around both the small and dilated glands is seen a connective tissue of considerable extent, made up of fusiform cells with long spindle-shaped nuclei. This connective tissue rests directly upon the smooth muscle matrix and in many places is exactly identical with the stroma of the endometrium. In many instances the glands both dilated and undilated seem to rest directly upon the muscle tissue. The smooth tissue is identical in structure to the smooth muscle tissue of the uterine wall. The intracanalicular projections, which are seen throughout the specimen, are made up for the most part of muscle tissue lined by a single layer of low columnar epithelium. In some instances there is imposed between the lining epithelium and the muscle tissue of these projections a definite layer of the endometrium-like stroma tissue. In other instances this stroma tissue is lacking. Occasionally some of the projections have a muscular matrix riddled with glands, some with and some without this surrounding stroma tissue.

Section along the posterior wall of the tumor, including the papillary projections: These papillary projections are all lined with a single layer of columnar epithelium. This epithelial lining invades the muscular tissue with deep, gland-like invaginations. In some instances this epithelial lining rests directly on the muscular matrix and in other instances there is a definite intervening layer of connective tissue between the epithelial lining of the glands and the muscular stroma. The sections through the large dilated cystic cavities show that these cavities are all lined by a single layer of cuboidal epithelium. In some instances these lining cells rest upon the muscular matrix and in other instances there is a definite intervening stroma of connective tissue.

Section taken through the uterine wall at the base of the tumor shows the inner half of these sections perforated by numerous glands, some showing considerable dila-



tations, but none are dilated more than 2 mm. This tissue answers the description of the ordinary diffuse adenomyoma of the body of the uterus, especially in the deeper portions of the uterine wall. The endometrium-like stroma is particularly striking, and here and there large patches of it can be seen surrounding the glands. The other half shows a normal muscular structure of the uterine wall and is entirely devoid of glands. This penetration of the uterine wall by glands is only present through the area where the tumor was attached, extending a few mm. below and then continuing upward for about 1 cm. Numerous sections taken through the uterine wall, with the exception of a slight general thickening of the myometrium, show it to be entirely normal. Sections taken through various portions of the lower uterine cuff show it to be lined by a single layer of low columnar cells with a thinned-out uterine wall which is entirely devoid of glands. Only here and there in the lowest part is there even a suggestion of cervical glands, and these are directly continuous with the lining of the cells of the canal. The discrete nodule in the upper portion of the uterus is an ordinary myoma and has no glandular inclusions.

From the above description, one can readily see that we are dealing with a submucous tumor of considerable size with a broad sessile at-

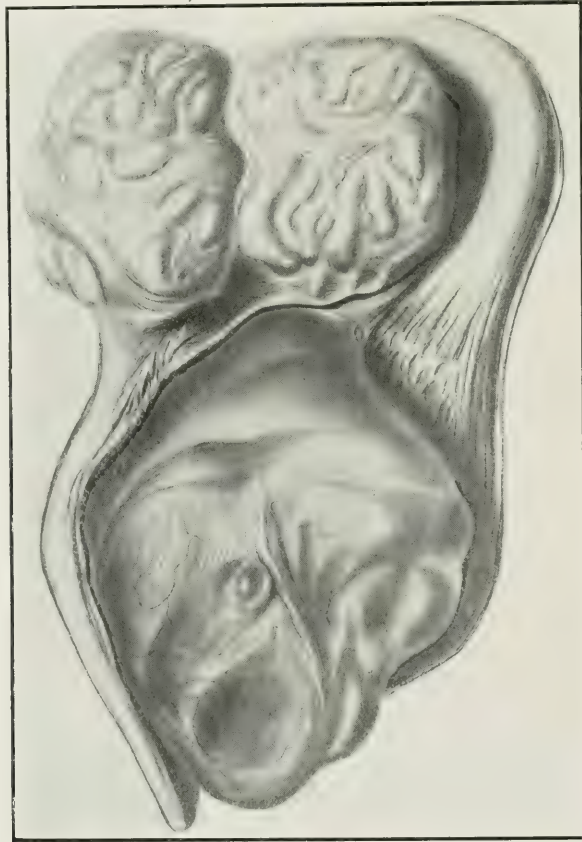


Fig. 1.—Drawing of uterus and tumors, reconstructed after operation. The uterus is cut along the anterior wall exposing the cavity and the two tumors. The upper tumor is bisected; the lower tumor completely fills the lower uterine cavity and shows its attachment laterally to the uterine wall. The coarser structure immediately adjoining the attachment of the tumor represents the extent of the infiltrated adenomyoma.

tachment to the uterine wall. The structure of the tumor is a muscular matrix in the substance of which are embedded glands, a considerable number of which surround cystic cavities, and for the most part they are identical with the glands of the endometrium; in many

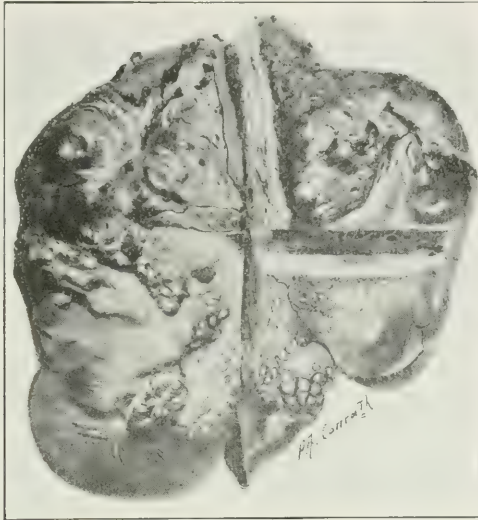


Fig. 2.—Posterior view of the tumor. The extreme upper half and central portion represent the area which was attached to the uterine wall; the slightly elevated projections seen in the lower portion of the picture represent the papillary excrescences.

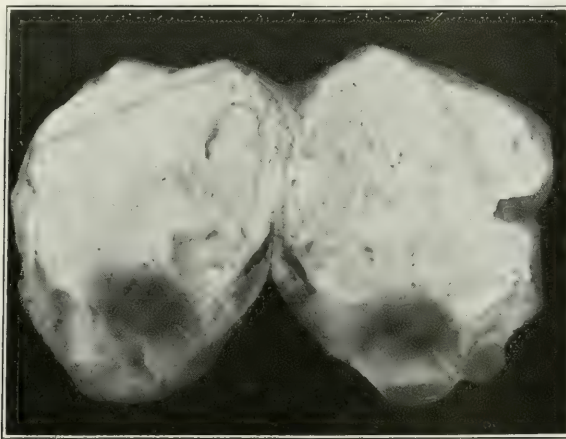


Fig. 3.—Cross section of submucous adenomyoma showing the muscular stroma perforated by countless numbers of slightly dilated glands. Large cystic cavities are seen along the inner and lower portion of the picture. The intracanalicular portions can be made out in several places.

instances these glands are surrounded by an endometrium-like stroma. The involved portion of the uterine wall at the site of the former attachment of the tumor has the same structure which is characteristic of ordinary diffuse adenomyomata. This adenomyomatous structure

is only present at this site, and infiltrates the uterine wall about one-half the distance to the serosa; the uterine wall elsewhere is entirely free of adenomyoma. We also note beside the cystic dilatation of the glands intra canalicular polypoid projections in the cystic cavities, not at all unlike intracanalicular adenofibroma of the breast.



Fig. 4.—Photomicrograph, low power. The muscular matrix perforated by numerous glands which show varied differences in outline and degrees of dilatation.

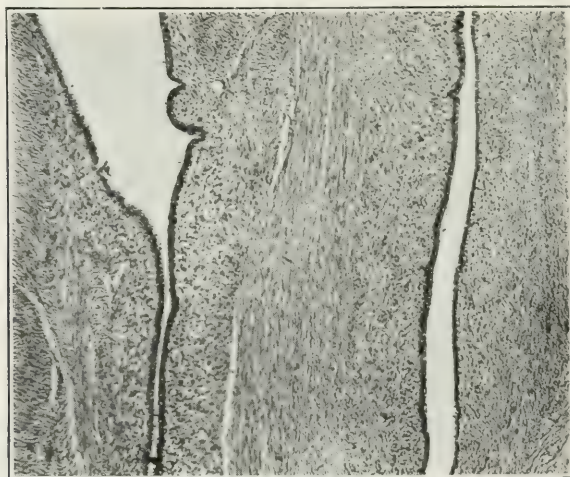


Fig. 5.—Photomicrograph, high power, showing two glands separated from the muscular matrix by an indefinite area of connective tissue stroma. This is particularly striking along the lower boundary of the upper gland.

I feel that the above characteristics concerning the structure, location and relations of this tumor, show rather conclusively that we are dealing with an isolated diffuse adenomyomatous growth on the wall of the uterus, which remained localized and continued to grow as a



localized tumor. As a result of pressure exerted on it by a surrounding normal uterine musculature, it was gradually expelled into the uterine cavity. The fact that the tumor filled the cervical canal can be explained by the previous filling of the upper uterine cavity by the discrete submucous myomatous nodule in this location. The adenomyomatous growth in its earlier stage must have been very similar to the case of Cullen's, the illustrations of which I have taken the liberty to insert in my paper. (Fig. 9.) Therefore, the source of the gland elements in my tumor were, originally, from the endometrium and, accordingly are of Muellerian origin.

The question might be raised: Why do not all of these glands have the pattern of the endometrium? We note that, in some instances, around both small and dilated glands there is an absence of the endo-

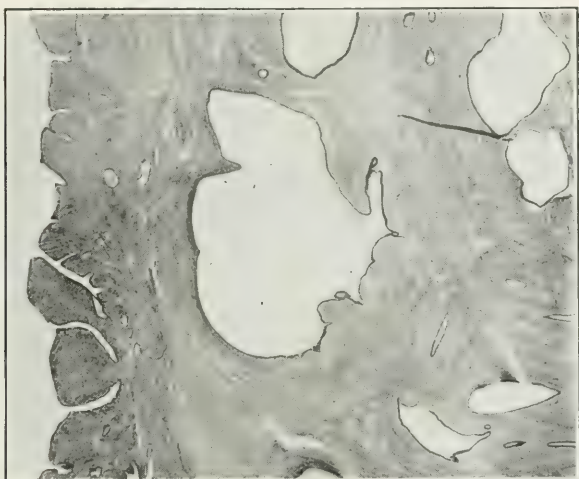


Fig. 6.—Photomicrograph. Section taken through the periphery of the posterior wall to an area which shows papillary excrescences. The structure of the tumor is also well seen in this picture.

metrium-like stroma. On the other hand, this endometrium-like stroma surrounds in varying degrees all sorts of glands, both large and small, throughout the tumor, being more marked in the base of the tumor and in that portion immediately adjoining the base. On account of the marked pressure which has been exerted on the tumor by the surrounding uterine wall, and on account of pressure which has resulted in consequence of the marked gland dilatation, this stroma tissue could readily have become obliterated. It is also quite justifiable to assume that the gland tubules could have penetrated the muscular matrix of themselves, the stroma being held on account of the increasing pressure.

So far as I know there is no case described in the literature with a histologic structure, which resembles to any great degree that of my

case. Robert Meyer reported a pedunculated subserous adenomyoma springing from the right uterine horn which in gross appearance, and histologically resembled my specimen very much. Meyer regarded his case one of Wolffian duct, or of parovarian origin, on account of the marked resemblance of the glands in his case to these structures. Meyer reported his case in 1903 and at that time stated that the specimen had no parallel. This statement apparently holds good today. Lockyer in his recent monograph describes this tumor in great detail and reviews Meyer's ideas concerning its origin thoroughly.

Meyer's tumor was bilobed, each lobe the size of a man's head and connected to the right uterine horn by a single pedicle. The tumor was made up chiefly of cysts and canals held together by matrix of connective tissue and smooth muscle. The cyst and canals were lined

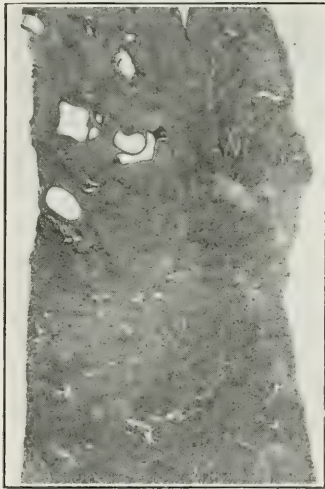


Fig. 7.—Photomicrograph, low power. Uterine wall at the attachment of the lower submucous tumor. The glands penetrate about half way through uterine wall. The serosa is not included in the picture, but the section represents practically the entire thickness of the uterine wall. Note the surrounding stroma of the glands.

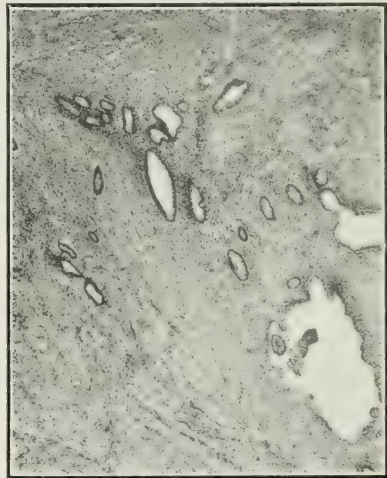


Fig. 8.—High power of adenomatous area in Fig. 7. Shows uterine glands with a characteristic stroma embedded in the uterine muscle.

by a single layer of cylindrical epithelium. At the site of attachment of pedicle tumor, there was a diffuse adenomyoma of the uterine wall and the canal system was traced directly into the uterine cavity.

Meyer has applied the term "organoid" to this tumor on account of the arrangement of the muscle around the canal system. He states that the only organ from which such a tumor could rise is the Wolffian duct and epoöphoron, and feels that the adenomyomatous state of the uterine wall had no genetic relationship with the tumor. Meyer explains the mucosal invasion of the pedicle as due to pressure exerted on the uterus by the tumor mass, as the result of which the

mucosa is squeezed along the lines of least resistance into the pedicle of the tumor.

Lockyer states that, so far as he knows, Cullen has never pronounced judgment on this tumor, but should expect him to regard it as an example of his variety of subperitoneal adenomyoma. From this description, the only essential differences between my tumor and Meyer's are: first, the fact that he is able to describe clear-cut muscle layers about the various glands and cysts, and that he regards this system as a long tortuous duct; second, he occasionally speaks of a connective tissue content of the tunie layers, but describes no definite layer of connective tissue, which were quite marked in my tumor.

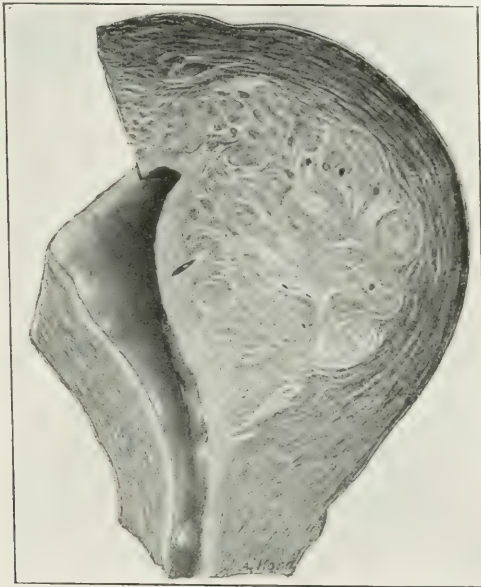


Fig. 9.—Photograph of Fig. 1, from Cullen's monograph on "Adenomyoma of the Uterus," shows a localized adenomyoma of the uterine wall with a slight tendency to being pushed into the uterine cavity. This picture represents a lesion which might be regarded as an early stage of a submucous adenomyoma.

Judging from the drawing of Meyer's tumor, the duct system he describes is not apparent as he claims, and in his other illustrations the laminated tunics about the canals do not appear to stand out clearly as his descriptions would lead one to believe. The fact that Meyer's tumor was directly connected with the uterine cavity, and the fact that there was definitely a diffuse adenomyoma of the uterine wall, must certainly bear considerable weight in considering this tumor primarily as part of a diffuse adenomyomatous condition of the uterine wall. The cystic dilations and the intracanalicular projections could readily be explained on mechanical grounds. Certainly these points cannot be totally disregarded, the more so since the sub-



mucous adenomyoma, which I have described with its cystic cavities and intracanalicular projections and which bears such a marked resemblance to Meyer's tumor, is definitely of Muellierian origin.

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819 UNIVERSITY CLUB BUILDING.

(For discussion see page 873.)

## PRACTICAL APPLICATION OF LOCAL ANESTHESIA TO SURGERY OF THE LOWER ABDOMEN\*

BY ROBERT EMMETT FARR, M.D., MINNEAPOLIS, MINN.

NOTWITHSTANDING what the facts are, or what the future may show them to be, concerning the possibility of applying local anesthesia to major abdominal surgery, it is perfectly evident that the vast majority of clinicians do not accept the premise that local anesthesia can be used with facility in routine abdominal work. While in some large clinics a proportion of 50 per cent, and perhaps in one or two instances even greater than this, has been reached, the abdominal surgery performed under local anesthesia exclusively, in our large clinics is probably under 10 per cent, and even then a vast majority of the cases are confined to the various operations for hernia and to extreme surgical risks in which the use of general anesthesia is considered too hazardous. In view of the fact that the dangers of general anesthesia, both immediate and remote, far outweigh those of local anesthesia, a fact which is, I think, admitted by everyone, there must be some reason, real or imaginary, for subjecting 90 per cent or more of the cases to the extra hazard imposed by general anesthesia. Is it necessary or advisable to administer general anesthesia to such a large percentage of our abdominal cases? Is it possible and expedient to replace general anesthesia by local anesthesia in a large percentage of the cases in which general anesthesia is now used? Obviously, if the margin of safety of local over general anesthesia is admitted, the main reason for denying patients this advantage must be based upon the assumption that the surgical indications cannot be met under local as perfectly as they can be under general anesthesia. It is the object of this communication to attempt to show that this assumption cannot

\*Thesis submitted for admission to the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, 1920.

be accepted in its entirety, and to present what might be termed the newer concept of the art of local anesthesia as applied to this field of surgery.

While a complete analysis of the reasons for the failure on the part of the surgical profession to accept local anesthesia in major surgery would take us too far afield, certain facts ought to be presented by those who have given special attention to this subject in order to dispel some of the phantoms and replace them by realities. Clearly, those who admit unfamiliarity with the subject are prone to accept its imaginary objections. On the other hand, to those who are most familiar with this subject the facts are so obvious that their presentation seems more or less absurd, and, yet, these facts must be presented by those who have acquired the greatest amount of experience in order that the general profession may receive the benefit of their work in this field.

To one who has had considerable experience and success in the use of local anesthesia the objections ordinarily advanced against it are largely evidences of inability on the part of the objector to perfect himself in its use. In this regard local anesthesia has been compelled to contend with much the same factors that obstruct every advance in science. Only a more exact and widespread knowledge will reduce and gradually eliminate this factor, and we would better, therefore, confine our attention to the real shortcomings of the method and consider some of the means by which they may be overcome.

#### THE PSYCHIC FACTOR

Undoubtedly the psyche of a patient plays an important rôle in relation to surgical treatment. However, the importance of this factor in relation to local anesthesia has been greatly overestimated. In its final analysis the amount of psychic trauma connected with local anesthesia will depend largely upon the education of the patient in relation to its use. Once the patient grasps the fact that local anesthesia is safer and more agreeable than general anesthesia and that his operation will be *painlessly* performed under its influence, the psychic factor will largely fade into insignificance, as I have had ample opportunity to verify. Too often the surgeon mistakes the patient's fear of suffering—a fear which has been established through ignorance or through a knowledge of the unsuccessful use of local anesthesia—for psychic incompatibility. The individual whose acquaintances in large numbers have undergone painless, successful operations under local anesthesia does not to any great extent show this much heralded bugaboo.

#### WOUND HEALING

The question of wound healing may be dismissed as an objection, as it has been proved beyond doubt that the use of procain does not in

any way impede the process of healing or predispose to infection. The reported preponderance of infections where local anesthesia has been used is undoubtedly the result of an interference with a refined technic due to the failure to establish complete anesthesia. Possibly, also, the class of debilitated patients reserved in some clinics for the use of local anesthesia may be a factor in the production of these statistics.

#### TIME

The element of time, while relatively unimportant, may be cited as a real objection to the use of local anesthesia. However, if we accept the dictum that the patient is the all important consideration, the element of time becomes relatively insignificant. Other things being equal, can we use the element of time as a shortcoming of local anesthesia? Allowing the patient to be the judge, and saying to him: "Local anesthesia is more pleasant, is safer, and your operation can be performed under its influence with more finesse, but I cannot spare the extra quarter or half hour required"—what would the verdict be? Besides, the facts show that with proper equipment and with modern technic many operations may be performed under local anesthesia with more dispatch than where general anesthesia is used.

#### HARDSHIP TO THE SURGEON

There is no question but that the routine performance of surgical operations under local anesthesia imposes a greater tax upon the mental and physical resources of a surgeon than where general anesthesia is employed. This is especially true in cases where the surgeon is not well versed in the use of the local method. Here, the possibility of failure, the faulty armamentarium, the division of attention between the operation proper and that required by the conscious patient, the necessity of using a refined technic, the strategy required in meeting complications and overcoming difficult technical details without discomfort to the patient, in addition to the extra time required, all tend to fatigue the surgeon. And, yet, as one's familiarity with the method increases, the pendulum swings until the difference between the two methods is not as great as one might imagine. With increasing experience the possibility of failure is replaced by a feeling of confidence; the armamentarium becomes stardardized; the division of attention becomes more or less automatic, as in the case of the clinical teacher in surgery who has learned to teach while operating; the use of a refined technic becomes second nature and instead of being fatiguing may be said to be exhilarating; increased experience enables one to meet the demands with a comparatively slight outlay of energy; and a strategy is developed by which the technical difficulties are overcome with comparative ease; and, finally, as the technic



becomes standardized, the time required, as I have already stated, is but slightly greater where local anesthesia is used.

#### DIFFICULTY IN ACQUIRING TECHNIC

Admittedly, there is considerable difficulty in acquiring the technic of local anesthesia as applied to major abdominal surgery. Of those who are successfully performing this work the number is small. Like all specialists the experts in the use of local anesthesia seem to follow the plan of making the technic appear as difficult as possible. Complicated rules for locating the special nerves, for instance, tend to magnify the apparent difficulties. As an example, the most recent book upon local anesthesia recommends that the six lower thoracic, three lumbar, and three sacral nerves be blocked on either side of the spine in the back for the performance of a pelvic laparotomy! Small wonder that such a method does not appeal to those who are in the habit of doing their work under general anesthesia. As a matter of fact, the technic of abdominal surgery under local anesthesia is comparatively simple, and a knowledge of it is exceedingly easy to acquire and can be readily mastered by any one who will focus his attention upon it for a short time, provided he is not so hidebound by age or prejudice that adaptation to an altered order of things is impossible.

#### METHOD OF OVERCOMING OBJECTIONS

Every effort should be made by those who have had unusual experience in the use of local anesthesia to develop the technic along the lines of simplicity in so far as it is possible to do so. While the highly specialized regional blocking may be desirable for a few trained experts, the average surgeon will find much more satisfaction in using direct infiltration. Its simplicity, its ease of application, its speed and its accuracy make one wonder why so much effort has been made to substitute nerve blocking for the method introduced by Schleich and Reclus. Provided local anesthesia is to become of practical use in abdominal surgery and to be taken from the hands of the few—experts, so-called—direct infiltration, or infiltration-block must be adopted as the method of choice. This method, when properly employed, fulfills all requirements, when combined with the proper surgical technic.

#### GENERAL CONSIDERATIONS IN RELATION TO TECHNIC

The prime essentials relating to the general preparation of the patient are: proper attention to the patient's psyche, a soporific which insures a good night's sleep upon the night preceding the operation, small doses of preliminary hypnotics to allay nervousness from the time of awakening in the morning to the time of operation, careful transportation to the operating room, a comfortable position upon feather pillows on the operating table, the exclusion of light from

the eyes by a moist pad of gauze, the constant attention of a well trained "moral anesthetist," whose duty it is to bestow every possible comfort and to allay, so far as possible, any fears which may beset the patient, the elimination of all unnecessary noises caused by instruments or other utensils, the exclusion of all conversation in the operating room, (possibly, in some cases, introducing pleasant music from a Victrola), the avoidance of all irritations, such as uncomfortable positions, tight strapping and the application of irritating lotions to the skin—these and numerous other details do much to reduce the handicap under which surgeons find themselves when attempting the use of local anesthesia.

#### LOCAL TECHNIC

Assuming that the above details have been carried out with some degree of completeness, every effort should be made to continue the procedure without allowing a break in the chain of protection against irritating influences. Team work and a smooth running machine are valuable assets, and a standardized, workable armamentarium is a prime essential.

Perhaps the most important period to be bridged while carrying a patient through the ordeal of a surgical operation under local anesthesia is that during which the anesthesia is actually being introduced. The success or failure of the procedure is dependent to such a large extent upon the comportment of the surgeon during these few minutes that we may on the one hand see inaugurated a smooth, efficient anesthesia with a successful operation upon a confident patient, or, on the other, a disgruntled, irritated, apprehensive patient whose confidence has been lost at the very beginning on account of some error in technic.

When introducing the solution, the development of the initial wheal is accompanied by certain preliminaries which are designed to relieve the tension under which the patient may be laboring. These preliminaries vary, depending upon the circumstances, but usually consist of a slight sponging, pinching, or patting of the skin over the field of operation. As the first needle prick is about to be made the anesthetist cautions the patient, stating that the doctor is about to give him a hypodermic. At the same time the surgeon requests the patient not to move when he feels the needle prick. When these precautionary measures are omitted, the unprepared patient is surprised, his confidence—which already may be more or less negative in quantity—is apt to be shaken, and a slight movement on his part is apt to result in dislodging the needle point, thus making it necessary to repeat the procedure.

From this period one important point is to be kept constantly in mind—the patient is to feel no more needle pricks throughout the

procedure of making the infiltration. It matters not at how many points the skin is to be pierced by the needle, the unanesthetized skin must not be pierced. It may be avoided by the following technic. The long needle is introduced through the initial wheal and advanced beneath and parallel to the skin surface in the subdermal fat to a point within a half to three-fourths of an inch of its base. Just in advance of the point the skin surface is made to curve inward by making pressure upon it with the finger of the opposite hand. The needle is thus made to enter the skin from beneath and a wheal is in this manner painlessly produced. During the withdrawal of the needle a subdermal infiltration is made between wheals number one and two, or, if desired, this infiltration may also be made during the introduction of the needle from the initial to the secondary wheal. This procedure may be repeated as often as necessary, and thus a field of any length may be traversed.

To my mind, this is the most important single factor in the technic of the administration of local anesthesia, and careful attention to the carrying out of its minutest detail will do much to facilitate the work. On the other hand, when following the usual technic, or that usually seen at least, where the patient is repeatedly pricked in an unanesthetized area, we must expect even the most stoical to ask for an interpretation of the term "painless." Even where the intradermal wheals are continued from the initial wheal and the skin infiltrated for any distance, too rapid injection will cause pain. Besides, this process is slow, laborious and unnecessary. The subdermal infiltration will be found to give complete anesthesia in from two to four minutes, and as the deeper layers should be anesthetized before the incision is begun this amount of time is sure to elapse before the incision can be made.

After the outline has been made upon the skin by the more or less regularly placed wheals and the line of subdermal infiltration, the deeper layers are anesthetized before making the skin incision. There are many reasons why the method of injecting the tissues layer by layer should be discarded, at least as a routine procedure. The delay occasioned by its use is in itself sufficient to condemn it, especially as the complete infiltration is so satisfactory. I feel, however, that the main objection to it is based upon the greater likelihood of the production of pain when this plan is followed. The immediate infiltration of the deeper layers gives the anesthetic time in which to act on these tissues while the preliminary incision is being made, towels applied to the skin, etc. Except in very fat persons one may quite accurately recognize the different layers as they are reached by the needle point and the requisite amount of solution may then be deposited. An approximate estimate of the thickness of the different layers, as well as a knowledge of the relative sensitiveness of the various tissues to be injected, is essential. Any errors as to the thickness of the different



layers are to be checked by the impression made upon the patient as sensitive areas are encountered. In the abdominal wall, for instance, after the subdermal infiltration is made the next layer to be encountered which interests us is the aponeurosis. This layer can be recognized by its "feel" and by the fact that the patient will manifest signs of discomfort when it is reached, although if care is used this discomfort is slight. The anesthetist can usually catch the change of expression on the part of the patient, but a desirable guide is the slight muscular contraction which invariably accompanies any appreciable insult to sensitive tissues. Once the approximate depth of this layer is estimated, the fluid is deposited in sufficient quantity to produce anesthesia ahead of and about the needle point for some distance, thus making further punctures possible without the patient or the local part realizing that it is being done. A perfect knowledge of the anatomy of the part allows one to make the injection without any complaint on the part of the patient, and with only slight muscular protest. Of course, one must regulate the speed and amount of the anesthetic used in a given area by the sensitiveness of the tissues, a condition dependent upon the location of the area attacked, as well as upon the make-up of the individual patient. For instance, one patient may allow the complete blocking for an appendectomy in two minutes without the slightest local or general protest, while in another patient of about the same dimensions five minutes may be required for the same procedure. The deep layers of muscles in the abdominal wall, while containing some sensory nerves, are relatively devoid of sensation and need very little of the anesthetic. But, as there is little objection to the use of the solution here, it is better to play safe and to continue the injection as the needle advances toward the properitoneal fat, which is the most sensitive tissue beneath the skin. This tissue is, therefore, approached and entered with a constant stream flowing from the needle. As soon as the slightest sign is manifested by the patient, or even if no signs, local or general, are shown, the area about the point of the needle is "soaked," the needle withdrawn and new fields attacked by repeating the procedure. The same precautions should be used by the surgeon when he is about to enter an area which may be sensitive, as when the first wheal is made. I usually say: "Let me know if you feel this;" or, "Is this sensitive?" etc.

There seems to be much timidity on the part of surgeons regarding the making of deep infiltrations into the abdominal wall. The dangers from this procedure are more apparent than real, and experience shows that they are practically nil. We have repeatedly advanced the needle through the abdominal wall with the abdomen open and fluid flowing from the needle in order to learn what takes place when this maneuver is carried out. Colored solutions have sometimes been used for this purpose. We have found that, provided the needle is

slowly advanced, the properitoneal tissue becomes swollen from the outflowing fluid and the peritoneum generally floats away from the needle point and is not subject to puncture, provided, as I have said, the needle is not advanced rapidly. The peritoneum may be punctured, reproducing the condition we have in the intraperitoneal injections of guinea pigs and other animals, where, as it is well known, intestinal injury does not occur. This fact is now established beyond question and should have marked influence in simplifying the technic.

While carefully carrying out the above principles in the minutest detail the field for infiltration is gone over methodically and systematically with the object of not missing a fraction of a square inch. It is here that the use of the pneumatic injector assumes a special rôle of superiority over the syringe. The constant source of supply of the solution relieves the operator of the necessity of filling or changing syringes, a maneuver which is prone to make the surgeon "lose his place" and to miss a small area which may correspond to the location of a sensory nerve. Again, the lightness and adaptability of the cut-off allows one to develop an ability to "feel" the location of the needle point and to introduce and direct the needle with the greatest ease.

Once the tissues are thoroughly "soaked" anesthesia should be complete almost immediately, or at least before the various layers are reached by the scalpel. The skin may be incised directly after the deep injection is completed, and a secondary cleansing with alcohol or some other solution is made.

In making the incision in abdominal cases it is well to avoid making pressure upon the abdominal wall. Even with a perfect anesthetization the pressure produced by the use of a dull scalpel, especially in unskilled hands, will cause the patient discomfort even in "interval" cases, while in cases of acute or subacute infection pressure will not be tolerated. In order to meet this contingency we elevate the skin between two pairs of towel clips while the incision is being made. (Fig. 1.) A sharp scalpel is used and multiple gliding strokes are made rather than forceful pressure of the blade through the tissues. The delay necessitated by the placing of towels for skin exclusion allows the deep tissues sufficient time in which to become anesthetized, and the incision is carefully carried down through the succeeding layers, care being taken not to slacken for an instant the vigilance regarding the elevation of the abdominal wall until the peritoneum is finally opened.

At this point I beg leave to digress for a moment in order to call attention to the usual causes of failures in some cases to obtain a satisfactory working condition when the abdomen has been opened under local anesthesia. Surgeons have frequently said to me when discussing this subject, "I can open the abdomen without any complaint

whatever on the part of my patients, but as soon as the abdomen is opened intestines present in the incision under pressure and the force and manipulation necessary in order to retain them within the abdomen not only causes my patients great distress but serves only to increase the expulsive efforts, and, as a result, the field of operation is so obscured that the operation cannot be carried on." Provided this condition presents frequently it is small wonder that surgeons find that the use of local anesthesia is unsatisfactory in major surgery, and especially in abdominal surgery.

The patient who does not have a complete anesthetization of his abdominal wall before it is opened, one who has not a complete abo-

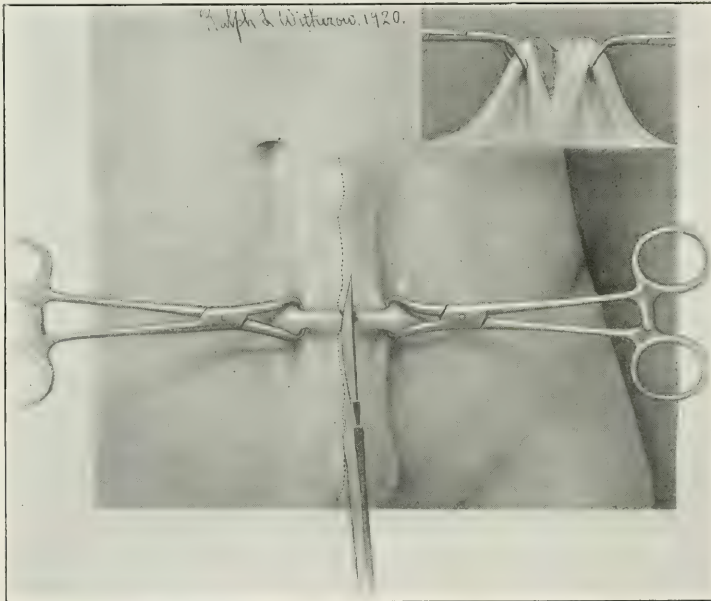


Fig. 1.—Method of elevating skin while making the incision.

lition of the reflexes of the tissues attacked, will, by the time the peritoneum is opened, have developed a combative action on the part of the abdominal muscles (an action, by the way, over which he has no control), which will, by causing a contraction of these muscles, tend to place the abdominal contents under a pressure which will force the viscera into and through the incision as soon as it is made. Counterpressure applied to the escaping viscera instead of relieving the situation serves only to add fuel to the flame, the condition going from bad to worse and the fiasco usually ending in a call for general anesthesia and a firm decision on the part of the surgeon not to attempt this procedure again.

This condition may present even in cases where the patient does not complain of pain, and possibly, in some patients no amount of local



anesthesia will prevent it. However, I have not encountered it in cases which were at all amenable to operation under local anesthesia. We do find an occasional person who loses all poise and cannot control himself when the test comes, and such a case should be given general anesthesia without delay. For the purpose of this discussion, however, we may consider only cases which are apparently satisfactory candidates for the local method. It is in this class of cases that the failures have come, for, as a rule, men do not attempt to force the method upon the other class. Given an average candidate, therefore, can this emergency be anticipated and prevented? As a rule the condition described is due to the fact that the patient has been caused pain during the infiltration and incision, notwithstanding the fact that he may not have complained. Surgeons differ very materially in their estimate of this factor. Some call a procedure "painless" when a patient is continually flinching, making grimaces in direct consonance with each painful maneuver on the part of the surgeon or even when mild restraint is necessary. Others call a procedure "painless" when they have been repeatedly called upon to reinforce the anesthesia. While some even consider a procedure "painless" when the patient is fervently grasping some friendly bystander by both hands and hanging on for dear life.

Much has been written upon the pain sense of the different intraperitoneal structures. Few authorities agree upon this important subject, each giving the results of his studies and observations. Careful study has been made of the works of Hertzler, Lennander, Haller, Bichat, Weber, Bloch, Richet, Kast and Meltzer, Ritter, Wilms, Propping, Ramström, Langley, Bayliss and Starling, Cannon, Auer, Kuntz and Mackenzie, and, in addition, a large series of my own cases have been carefully observed in order to clear up, if possible some of the disputed points. Going over the literature one is struck with the marked contrast in the reports of different observers, and, aside from theoretic or anatomic grounds upon which arguments are based, I believe that much of the difference of opinion is due to the fact that the findings are far from constant and vary somewhat in different individuals even under similar conditions and vary greatly under a variety of conditions. The various stages of peritonitis greatly influence the sensitiveness of the parietal peritoneum and the viscera. The general condition of the patient must be taken into account, and one must not forget that the patient who has been a sufferer with a painful retroversion and chronic appendicitis will respond much differently than will an individual who is the subject of some other pathological condition. It is generally taught that the parietal peritoneum only is sensitive and that the viscera are devoid of pain sense in the absence of traction upon the mesentery. It has been my observation that this is not entirely true. Traction upon the intestine,

even without traction upon the mesentery, will cause pain, and heat applied to the exposed intestine will produce cramps which are described as gas pains. I have had a young man of excellent poise and intelligence state that the introduction of the needle through the wall of his intestine was painful, and a careful test showed that he could feel the needle pass through his intestinal wall, even though his eyes were covered and an effort was made to deceive him. Traction upon the mesentery was here carefully excluded. The parietal peritoneum, in the absence of inflammation, is insensitive to light touch or even to scratching. However, pinching or traction is disagreeable. In disease this structure is sensitive even to light pressure. This is especially true of certain areas, as for instance the culdesac. The results of observation will also vary with the manner in which the experiment is made. A brisk, quick action will cause complaint, when the same act stealthily performed may be tolerated readily. One observer states that the mesoappendix may be clamped without pain, and this observation is based upon a series of fifty cases; while another finds that this structure is always found to be sensitive, especially in acute appendicitis. The facts are that the sharp application of a hemostat to the meso will elicit a complaint from the conscious patient who has not had preliminary medication, unless cocaine has been used. (Some authors state that cocaine acts as a general analgesic, but I have had no experience with it). However, if one slowly and carefully applies the clamps, the patient may not remonstrate.

Many factors must be considered in making observations. Whereas, as a rule the patient who is undergoing an operation under local anesthesia is ready to complain at the slightest opportunity, and may even complain when not being hurt, perhaps with the hope of making the surgeon more cautious, we must not forget that he may have been compelled to suffer so much during the first stages of the operation that, by comparison, the clamping of the mesoappendix may not bring forth a complaint.

I have found frequently that a strong clamp may be placed upon the mesoappendix, provided it is forced down very slowly, with only slight complaint on the part of the patient. This is also true of many other tissues. We have found that the base of the appendix may be clamped with no pain sense after the meso has been blocked or divided. The ovarian pedicle and even the fundus of the uterus are tender and cannot be attacked without causing pain, although the latter may be found to be almost insensitive in some cases. The large vessels in the mesentery are sensitive; and even those in the omentum, if clamped close to their origin, may show pain sense. There is, therefore, an opportunity to perform operations upon most of the pelvic viscera when the above mentioned areas can be blocked before the operative procedure is begun. Pathologic conditions which cannot be handled without traction upon the mesentery, mesoappendix, or poste-

rior abdominal wall may not lend themselves so readily to this form of anesthesia. Here again, however, we have a good illustration of the difference between careful and rough handling of the tissues.

#### THE PELVIS

All work in this region is best done with the patient in the Trendelenburg position, and it is desirable that the position be assumed several minutes before the anesthetic is injected, and that when in this position the patient be at ease and comfortable. The accessories shown

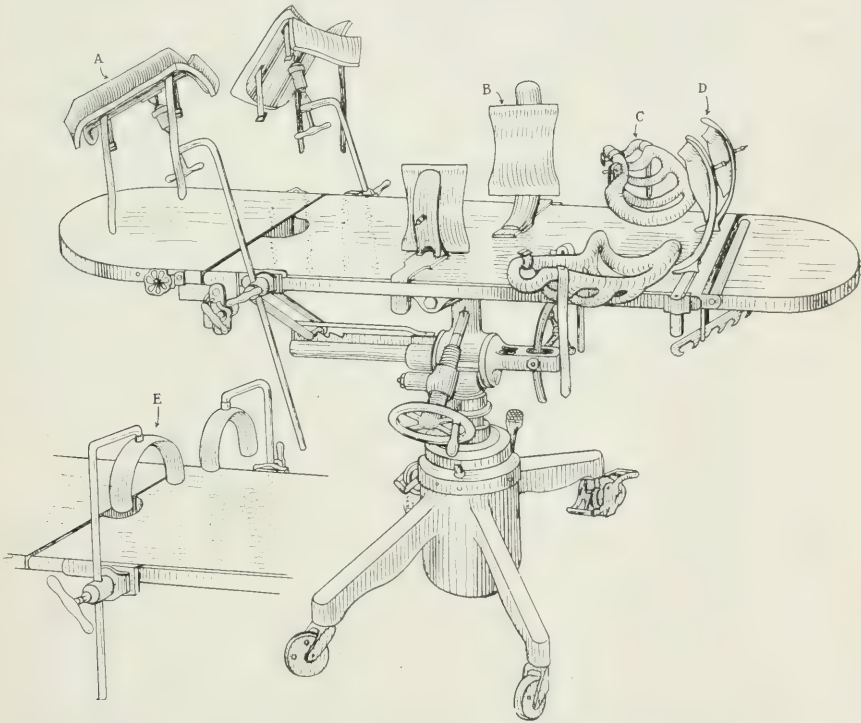


Fig. 2.—Special table with appliances for making the patient comfortable. *A*, Adjustable leg holder; *B*, lateral supports for tilting; *C*, adjustable arm holders; *D*, shoulder supports for Trendelenburg position; *E*, efficient, comfortable thigh restraints. Note: *B* and *D*—inflated segments of auto tire.

in Fig. 2, are valuable adjuncts in obtaining the desired comfort. Soft pillows, pneumatic cushions for the shoulders, metal legholders which restrain but do not constrict, the avoidance of too sharp flexion at the knee, which, with an extension of the head upon the neck greatly increases muscular resistance of the abdominal wall, and a careful adjustment of the drapes all tend to facilitate work upon this region. While attention to these details may seem unimportant, success can only follow such attention, and he who is not willing to pay heed to the smallest detail and does not recognize the prime essentials, of which the patient's comfort is one of the most important, will con-



tinue to bore us with the information that local anesthesia is unsatisfactory in pelvic surgery.

The abdomen being opened by an incision which is liberal in its proportions should present a negative pressure. Retraction should be made in a vertical as well as a lateral direction, that is, at right angles to the plane of the abdominal wall, and at first the upper or umbilical end of the incision should be lifted. This increases the capacity of the upper abdominal cavity and generally the force of gravity alone will cause all small intestines to migrate above the pelvic brim. In case this ideal condition does not prevail and some coils of intestine remain in the pelvis, they may generally be "kicked" out and upward by means of the rubber tipped thumb forceps. Even though in some instances a fairly large amount of the small intestines hangs over the pelvic brim this may not materially interfere with the performance of the more simple pelvic operations such as suspensions, appendectomies, and the like. The retraction must be carefully made, and the force used must be so graduated as to prevent any sudden, jerky lifting of the abdominal wall, which is apt to prove painful to the patient and to cause the much dreaded expulsive effort. As a rule no sponges are introduced either for the purpose of transferring the intestines from the pelvis to the upper abdomen, or for the purpose of holding them in that position. Under ideal conditions this should not be necessary and generally the only reason for using them is to prevent soiling.

The first point to be blocked upon entering the pelvic cavity from above is the round ligament. This is accomplished by having the assistant gently lift the abdominal wall in the region of the wound opposite the round ligament. (Fig. 3.) This allows the operator to see some portion of the ligament, which is carefully picked up with the long tissue forceps and steadied while the needle is inserted into it. A point well toward the front is chosen as the nerve supply comes from the direction of the abdominal wall. A wheal is raised and an effort made to extend the infiltration beneath the peritoneum on both sides of the round ligament. This maneuver is repeated on the opposite side and the technic to follow will depend upon the operative procedure which is to be carried out. Provided the appendix is to be removed this may be done while the procain which has been injected into the round and broad ligaments is given plenty of time in which to disseminate. A delay of a few minutes is rather desirable than otherwise.

With this technic all of the simpler operations within the pelvis may be performed. A maneuver which causes the patient some distress is the elevation of the fundus from the culdesac, which I have mentioned before. While the disturbance is not great, it may be well in nervous individuals to precede the operation by introducing a vaginal pack, with the patient in the knee-chest position. This greatly facilitates the replacing of the uterus.

Ovarian cysts of large size are best evacuated by suction through a comparatively small abdominal incision, the walls being grasped by tenaculi as soon as they become slightly relaxed. In this manner the cyst may be delivered, the pedicle blocked and dealt with without the slightest sensation of pain and without the possibility of soiling, which becomes an exceedingly important matter in malignant disease.

Even where the results of inflammatory disease are present much

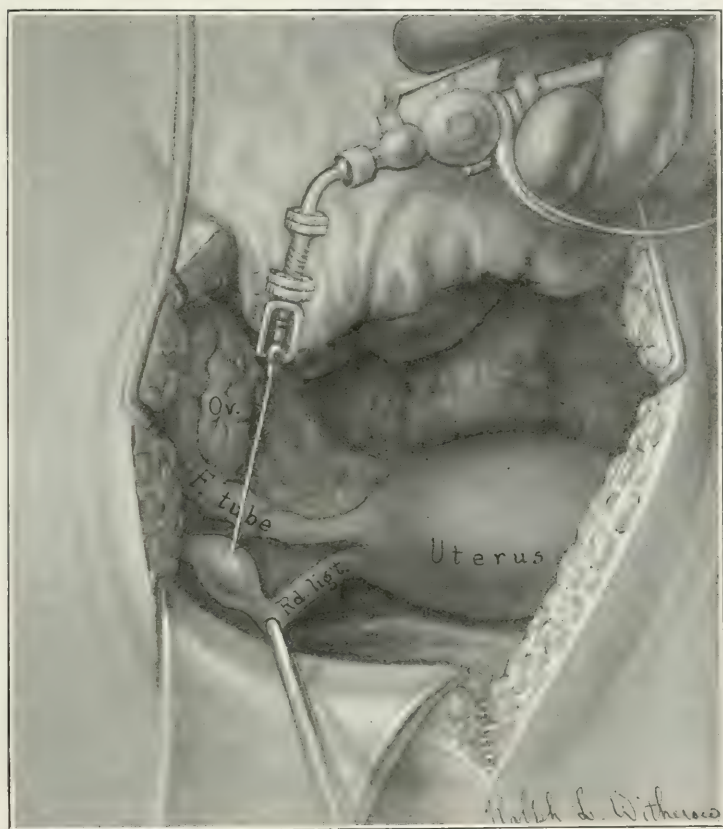


Fig. 3.—Showing method of blocking the round ligaments by injection.

may be done by strategy in meeting the indications. A perfect exposure with a perfect negative pressure may and often does give one the opportunity to see the retaining bands which anchor the tissues that are to be excised to the posterior abdominal wall with the aid of only slight traction while the bands are cut with knife or scissors and the parts liberated. We have in a number of instances removed adherent pus tubes by following this plan. Masses which appear very adherent and resistant will be found at times to shell out easily after cutting the "key" bands directly under the eye. The important point is to locate the lines of cleavage with as slight an

amount of traction as possible and to clip the retaining bands as they appear.

The removal of large uterine or ovarian tumors is accomplished with the greatest ease, provided the pedicles are sufficiently long. Tumors with short pedicles, when delivered, are apt to place the pelvic tissues upon the stretch and therefore produce distress. We have for many years performed all our hysterectomies and myomectomies under straight local anesthesia, except in this class of cases. In all cases where these complications are probable, or where pelvic inflammation is present, or in the presence of malignant disease, the condition may be met satisfactorily by augmenting infiltration of the abdominal wall, just described, with a caudal anesthesia.

#### CAUDAL ANESTHESIA

The analgesia resulting from the introduction of procain into the caudal canal is usually sufficient, especially with the patient in the Trendelenburg position, to allow one to make free dissections in the pelvis. We have, indeed, occasionally found an anesthesia up to the third or fourth thoracic nerves. Four ounces of one-half per cent procain has given us the best results. Steel needles of rather large caliber, from which the temper has been removed, are used. They are equipped with blunt obturators which facilitate their passage along the sacral canal and safeguard them from entering the veins. The patient is placed in the prone position, face downward, the skin and subcutaneous tissues anesthetized and a small puncture made with a tenotome. The fluid is introduced slowly, the guide being the patient's complaint of pain along the course of the nerves. In our experience slight toxic symptoms are not uncommon with this form of anesthesia, and in very fat women the sacral hiatus is sometimes difficult to locate. The toxic symptoms consist of pallor, accelerated pulse and nervousness, and have never, in our experience, been alarming. Provided this form of anesthesia is proved safe, it would seem probable that it will become the method of choice for pelvic, rectal and bladder work.

Under ideal conditions the absence of movement of the pelvic viscera, the blanched condition of the pelvic organs permitted by the freedom from abdominal packs and straining on the part of the patient, the possibility of deliberateness and the opportunity to minimize trauma, with the additional advantage that results from a perfect postoperative repose of the viscera in the same relative position they occupy when the peritoneal toilet is completed, at once place the above detailed method upon a plane which challenges the best that competing forms of anesthesia can present—this, in addition to and notwithstanding its admitted advantage over any other form of anesthesia in regard to safety.

REID CORNER.



## A STATISTICAL STUDY OF FETAL DEATHS OCCURRING IN THE SERVICE OF THE WOMAN'S HOSPITAL OF NEW YORK

BY HAROLD C. INGRAHAM, M.D., NEW YORK CITY

THE following report covers a series of three thousand deliveries at the Woman's Hospital with a fetal mortality of four and six-tenths per cent (4.6%). The series includes both private and ward cases from the seventh month of pregnancy until the mothers were discharged from the Hospital, which in the ward cases is two weeks, and in private cases two to three weeks. There was a total of one hundred and thirty-eight fetal deaths. Of the hundred and thirty-eight fetal deaths, sixty-eight, or 49.2 per cent of the total were stillbirths.

The following summary shows the probable cause of death in the 68 cases of stillbirth: Birth trauma, 38; placenta previa, 7; toxemia, 18; fetal abnormality, 2; miscellaneous, 3.

In those cases in which the death was due to trauma there were sixteen cases of forceps delivery: six high, ten medium and low. In four of these we cannot definitely attribute the death to forceps delivery as one of the four was done on a seventh months' premature baby, one on a case with prolapsed cord and two on cases with toxemia of pregnancy. High forceps were done on two cases with deformed pelvis, disproportion, and protracted labor. There were three craniotomies in cases of protracted labor and disproportion. In nine cases of podalic version, four were done for prolapsed cords, two after forceps had been tried in cases of disproportion and two on cases with toxemia of pregnancy with convulsions,—one after a vaginal hysterotomy and one in placenta previa.

There were seven cases of breech extraction, also seven cases of placenta previa, six of which were either partial or lateral and treated by cervical bags. One was delivered by version after bagging.

Of the eighteen cases of toxemia, six had convulsions, which developed during labor. One of these was delivered by version, the other by medium forceps. The other four were premature and delivered by vaginal hysterotomy. Of the twelve remaining cases, five went into premature labor, three having a premature separation of the placenta, four were induced and one was delivered at term with forceps. One was delivered normally at term but had a rupture of the velamentous insertion of the cord.

We have two cases classed as fetal abnormalities: one a spina bifida with cleft palate, the other at necropsy showed an enlarged thymus.

Under the miscellaneous group we have two following rupture of the uterus, one a rupture of a tubal pregnancy.

The remaining seventy fetal deaths, or 50.8 per cent of the total, are divided into two classes: those dying within three days after birth and comprising a group of forty-one cases, and those dying before discharge, but after the third day of birth, comprising a group of twenty-nine cases. In the cases comprising the first group we have fourteen premature babies. One of these had a patent foramen ovale, one was a breech extraction and developed symptoms of intracranial hemorrhage and two were eclamptic cases. We have one due to pneumonia, two in twins, (hydramnios being the only cause found), one to congenital abdominal anomaly, four were breech deliveries, nine were forceps all with intracranial trauma. There were six cases of atelectasis, three of toxemia of pregnancy and one of protracted labor which died of intracranial hemorrhage. The twenty-nine cases comprising the second group were classified as follows: umbilical hernia, 1; acute inanition, 2; cerebral hemorrhage, 8; premature, 4; hemophilia, 2; gastroenteritis, 1; cellulitis, 1; pneumonia, 2; icterus neonatorum, 3; spina bifida, 1; congenital pyloric stenosis, 1; congenital intestinal obstruction, 1.

Of the cases in which death was due to cerebral hemorrhage, four were forceps deliveries and two followed breech extraction.

From the previous data it would seem that in the cases of stillbirth, toxemia was the greatest factor, while the next most common appears to be prematurity and the third the result of forceps delivery.

In the cases dying after delivery but before the third day, we find prematurity as the most common factor, while in the cases dying after the third day we find cerebral hemorrhage resulting from forceps or breech extraction the most frequent cause.

It would seem that with more careful prenatal care the two principal factors, toxemia and prematurity, could be much lessened, and perhaps with increased study of the case while in labor, with some different procedure of delivery, that this mortality could be somewhat lessened.

133 EAST FIFTY-SEVENTH STREET.

## THE EDUCATION OF NURSES FOR OBSTETRIC SERVICE\*

### THE SOLUTION OF A SOCIOLOGIC PROBLEM

BY SYLVESTER J. GOODMAN, M.D., F.A.C.S., COLUMBUS, OHIO

THERE are several fundamental facts which must enter into the consideration of the education of nurses for obstetric service. I think you will accept these without reservation. First, that if the world is to survive, women must continue to bear children. Second, that if women do bear children, they must have competent nursing in cooperation with skillful obstetric service. Third, that none of us can hope to see the day when all parturients can or will go to a hospital for delivery. Fourth, that there will always be patients who are unable to pay large fees for the services of the obstetrician and nurse. This does not apply to the charity class, but to the family of limited or fixed moderate income. Accepting the above as reasonable, let us see how we are concerned with this problem and endeavor to formulate some plan or system for dealing with the same.

Let us begin the consideration of this subject by looking into the matter of obstetric morbidity and mortality. In a recent article (*Jour. Am. Med. Assn.*, 1, No. 8. Page 599)

"There is a general impression of a great improvement in the last century. This impression is based on a comparison of mortality records in hospitals and in the community."

"During the past thirty years, the mortality has been reduced to a fraction of the former rate. For example, the mortality from pneumonia has decreased from 186.9 to 82.4 per hundred thousand; from diarrhea and enteritis under five years of age from 46.3 to 12.4. The mortality from pregnancy and the puerperal period was 15.2. The maternal mortality rate in the United States population." "Few realize that the death rate at the age of childbirth is the same as in 1915, in the death registers. In 1915, among women aged fifteen to twenty, the deaths were, among women aged fifteen to twenty, 10,134 from childbearing; 8,766 from the various causes; 5,424 from cancer."

\*Read at the Thirty-Third Annual Meeting of the American Society of Gynecologists, and Abdominal Surgeons, 1915.



all these ages syphilis was reported as the cause of death 647 times and gonorrhea 174 times."

Is this collection of statistics not startling? Can we not do something to better the conditions which contribute to such a state of affairs? The discussion of the nursing problem is a definite movement toward that goal. Many graduate nurses will not accept obstetric service. Some few will engage for the care of these patients if the delivery is to be made in a hospital. For the patient who cannot or will not go to a hospital it is almost impossible to secure a competent trained nurse. I am interested in this matter more from the standpoint of the practitioner than that of the specialist because it is to the family doctor we must look for better obstetrics.

I do not believe that pupil nurses are sufficiently impressed with the importance of this branch of service and the good that can be accomplished by the conscientious care of obstetric patients. They should be shown that practically all surgery is now performed in hospitals with pupil nurse attendance; that typhoid fever will be soon relegated to ancient history; that pneumonia and the various zymotic diseases will be either prevented or quickly cured; that contagious diseases will be treated in special hospitals. Then, there being no more war, obstetrics will be the principal service for the employment of trained nurses. It is a grave mistake if we allow the nursing profession to cast aside this service without some effort on our part.

The average nurse, graduated from our hospitals today, is a good surgical assistant. She can make dressings, assist in operations, give anesthetics and carry out postoperative orders better than the average medical man. For our surgical patients she is invaluable and many a patient owes his life to a good nurse as much as to the surgeon. For medical cases our nurses are fairly well trained considering the fact that most of our hospitals are really surgical infirmaries.

The average trained nurse is not a good obstetric nurse. She is not interested because obstetrics is not as spectacular as surgery and because there are two patients to attend. In some schools of nursing the lectures are so primitive that the pupils get nothing out of them; in other schools the teaching is so technical that the girls fail to grasp the subject, or, on the other hand, they become pseudoobstetricians and prefer only institutional work. I have discussed this subject with the heads of various training schools. They are very loath to reduce any of the requirements, and, as my good friend and teacher, Dr. J. F. Baldwin, says, "they seem to overlook the patient." The solution of the problem seems to me to be in the establishment of schools, or courses in existing schools, for the training of *Obstetric Attendants*.

*Obstetric attendants* need not receive as much instruction as is given the regular pupil nurse because they will be employed in maternity service only. The course need not last more than one year, if that long. They may be registered by the State if thought desirable.

There are many hospitals which do not have the requisite number of beds for state registration. These institutions find it most difficult to secure enough pupils. The entrance requirements are so high that even the large hospitals have trouble filling their training schools. There are not enough girls, of the type required under the state entrance regulations, and if they are obliged to spend three years in order to secure the R.N. they naturally seek the larger hospitals. In the last few years many small hospitals, which were filling a great need in their respective communities, have been forced to close on account of inability to secure nurses. These smaller hospitals could do a great service in training these attendants. I believe that they would have little trouble in securing good girls for their schools if the requirements were less rigid and the course shorter.

These prospective pupils need not be high school or college graduates. There are many girls who can make a bed so that the patient is comfortable; who can comb a woman's hair; bathe a baby; keep a room orderly and be polite to domestic servants; who never had any training except that learned by helping mother. Many college graduates never learn to perform these helpful tasks.

There are some fundamentally important subjects that these *attendants* should learn. Naturally, they should be taught tact and loyalty to the attending physician, politeness (usually learned at home), kindness to patients, cleanliness, willingness to assume any *emergency* duty in the home and, the danger of talking too much. Above all, she should be taught to show some human sympathy to the parturient and be impressed that this is one of the most important attributes of a good obstetric attendant.

Pupil attendants should be given an elementary course in the anatomy and physiology of the female reproductive organs. They should have an idea of the appearance of the vulva when affected with lewd diseases and know how to use prophylactic measures against contamination and self-infection.

Antisepsis and asepsis should be drilled into the pupil at every step of her training. They should have at least three approved methods of cleansing the hands before attending at delivery. It is not necessary that they be given an advanced course in bacteriology but should be taught the value of a bar of soap and a rice straw brush. They should know how to sterilize the various utensils usually found in the household cupboard and which might be needed in "setting up" for a delivery at home. Even the homes of the rich will not have all the utensils to which trained nurses become accustomed in the hospital.

The attendant should have an idea of what the expectant mother usually prepares in anticipation of confinement and should know the application of these articles. She should know what to do when she arrives at the home of the patient; the disposition of the children; the arrangement of the delivery room; the placing of the

bed with regard to light, heat and ventilation, open fires and doors; the means of securing water and other things needed in the room; how to make the patient comfortable and confident while awaiting the supreme moment. She need not know which blade of the forceps to hand the accoucheur if she has tact enough to win the confidence of the patient. It is important that she know how to use a rubber catheter and the method of preparing the vulva before employing that instrument.

It is very important that we teach them the care of the puerperal patient. The attendant must be instructed in the care of the breasts, too often neglected in the regular training schools, and the feeding of the babe at the breast. The care of the eyes, ears and nose of the newborn should be dwelt upon. The pupil need not be taught the preparation of an approved chart. She should be taught the use of a thermometer and, perhaps, the use of the hypodermic syringe. It would be well if she could keep a record of the lochia, breasts, amount of food taken by the babe, bowel movements, etc.; but, if the temperature is normal and the patient happy and contented, the attendant has fulfilled her purpose.

Attendants need not be taught how to control postpartum hemorrhage, except that they know how to properly massage the womb. However, she should be taught to recognize a convulsion and to put something between the teeth to avoid injury to the tongue of the patient. She should call your attention to eruptions, sores and discharges but need not know what to do in order to relieve these conditions. That is your own duty. She must *carry out orders as you leave them* and call upon *you* to make any changes. If we can train a large number of good, bright, clean girls, with average mental ability and an ordinary education, in schools adapted to this purpose, we will perform a great service for the public and go a long way toward the improvement in obstetrics so earnestly sought. We will not be treading upon the toes of any of the existing schools, or are we taking away any income from the regular trained nurses. The regular trained nurses will find plenty of work with the surgeons, public health and industrial services, institutional and teaching work,

*We must have nursing service for obstetric cases.* The public will thank us for educating these *obstetric attendants* because their work will be their specialty and their wages will be within the reach of the average patient. Thus more people will engage competent nursing care; the obstetrician will have less trouble securing help; obstetric nursing among the nonrich and the agricultural folk will be taken from the hands of ignorant old ladies and sepsis will be lessened. The nursing profession, the medical profession and our very necessary ally, *the public*, will all be satisfied.



## MATERNAL WELFARE IN RELATION TO THE PREVENTION AND EARLY DIAGNOSIS OF TUBERCULOSIS\*

BY ARCHIBALD L. McDONALD, M.D., DULUTH, MINN.

IT may seem a far cry from this conference on tuberculosis to the problems of the obstetrician, but the purpose of this paper is to show important points of contact. Statistics commonly quoted prove that childbearing is second only to tuberculosis as the cause of death in women between 15 and 45 years of age. Wonderful progress has been made in these branches of medicine during the last fifty years. With full appreciation of the discoveries in regard to etiology, pathology, and treatment of tuberculosis, one can say that hope for reduction of mortality lies in early recognition and prompt treatment of incipient cases rather than in new methods of therapy for advanced conditions. This is so evident in results obtained by diagnostic clinics and visiting nurses that no emphasis of such a statement is needed before this body. So, in obstetrics acceptance of the principles of asepsis, making possible obstetric surgery and preventing puerperal infections, studies of toxemias and their prophylaxis, and recognition of contracted pelves, to mention but a few of the advances, have wonderfully reduced maternal and infantile mortality.

However, accepted statistics demonstrate that each year, at least 15,000 women die from direct effects of childbearing; that of each 1000 births registered 5 mothers die, 45 babies are stillborn, and of each 1000 born alive, 40 die within the first month. Such startling figures are really underestimates, at least as regards the mother, since many of the late effects of pregnancy though concealed, are only less direct factors in death from nephritis, severe anemia, or tuberculosis. The really distressing part of the situation is the fact that during the last seven years there has been little or no improvement, save only in one group of women, and here lies our hope. Data collected by the Metropolitan Life Insurance Co. demonstrate that among women who receive modern prenatal care and proper confinement, the following striking results have been obtained: (1) Instead of 5 only two women of each 1000 die; (2) instead of 45 only 12 babies are stillborn in each 1000, and (3) 10 instead of 40 die during the first month. Obstetricians have learned and are bringing to the public the same principles of prevention and early treatment of incipient conditions in their field as this organization advocates in tuberculosis. Pregnancy imposes a definite burden on the expectant mother, there is a narrowed margin

\*Read before the Mississippi Valley Conference on Tuberculosis, Duluth, Minn., Sept. 3, 1920.

of safety between health and disease, and greater liability of serious breakdown than under normal conditions. Most of the so-called "accidents" are preventable and the remainder are due to conditions which can be recognized at a period when proper treatment may be offered without imposing undue risk to mother or child.

In Minnesota we use the term "Maternal Welfare" since as obstetricians we are more directly concerned with the mother, at the same time realizing, that concomitantly and as a direct result, we can and do obtain proportionate reduction in fetal mortality. We believe that every pregnant woman should receive: (1) Thorough consideration of her history, and careful physical examination as early in pregnancy as that condition is suspected. (2) Definite instructions for hygiene and proper advice concerning special indications. (3) Periodic examination and conference at regular intervals or at the onset of certain symptoms previously explained to her. (4) Examination and arrangements made for confinement during the last month of pregnancy. (5) Adequate care under suitable surroundings at labor. (6) Proper rest and care during the puerperium and restoration to complete health before discharge. (7) Close cooperation between maternal welfare work on the one hand and medical or tuberculosis specialists on the other. This we believe offers the great hope of reducing the penalty of motherhood and conserving the newborn.

Great as is the burden of tuberculosis or maternity individually, when the conditions are combined in the same patient, the load is well-nigh unbearable. We are all familiar with the aphorism of the French quoted by Osler, "A woman threatened with tuberculosis may bear the first accouchement well, the second with difficulty, a third, never." The question may be considered from two standpoints. (1) Tuberculosis as a complication of pregnancy. (2) Pregnancy as a complication of tuberculosis.

The obstetrician is primarily concerned with the first phase of the problem. The preliminary conference and examination during pregnancy will place the patient in one of three categories: (1) Tuberculous, though hitherto unrecognized; (2) An arrested or cured case as judged by the history and physical signs; (3) The great majority of normal expectant mothers. For the first two classes careful consultation and well considered advice is necessary. For the supposedly normal women we must remember that pregnancy itself and especially the complications thereof together with those of labor and the puerperium, lower resistance and prepare the tissues for invasion by tubercle bacilli, either as newcomers, or of course most often by breaking down the protective encapsulation of a quiescent process. Such predisposing complications include: (1) Early nausea and vomiting which may easily pass to serious malnutrition. (2) Necessary restriction of fresh air and exercise. (3) High grade anemia which

is not uncommon. (4) Toxemia and nephritis. (5) Glycosuria, and rarely, diabetes. (6) The effects of labor especially; hemorrhage with its resulting anemia, and sepsis followed by malnutrition. Obstetricians have come to an appreciation of these risks and it is our earnest expectation that more universal attention to maternal welfare during and after pregnancy will lead to gratifying results in the prevention and early diagnosis of tuberculosis.

Pregnancy as a complication of tuberculosis is a problem presented to the internist and those dealing with incipient forms of the disease. Much has been written on this subject and only a few general propositions will be here discussed:

(1) Except in advanced forms of tuberculosis, there is nothing in the general condition of the patient to preclude the possibility of pregnancy.

(2) It is the most serious complication of the disease which can occur, and it is one that may be avoided. The effect is always detrimental, involving as it does severe and constant drain on the maternal organism and carrying with it the possibilities of toxemia, anemia, and infection, any one of which may lead to exacerbation of the disease or recurrence of an apparently healed process. Even in cases where tuberculosis is long arrested, the risk of pregnancy can be accepted only after careful consideration and then with fear and trembling.

(3) In outlining hygiene and treatment for a case of tuberculosis this question of pregnancy must be frankly discussed and proper advice offered. To neglect it is a greater injustice than to allow exercise to a febrile patient. In fact, it should be one of the first considerations. The answer may be isolation from her husband, the use of contraceptives, or an operation closing the fallopian tubes, depending on individual conditions.

(4) If however pregnancy occurs in a tuberculous woman it should call for prompt consultation with an obstetrician and careful consideration concerning the proper course. The decision will depend on the probable resistance of the mother in relation to the strain of pregnancy and labor. In other words it will be entirely a matter of clinical judgment, influenced, of course, to a certain extent by the desire of the patient. Our first concern is in the interest of the mother and she should not be allowed to jeopardize her life to carry on the pregnancy. No matter how great may be the desire for children the risk should be permitted only after an appreciation of the danger involved.

(5) The common advice in the literature is to interrupt the pregnancy if the consultation is held during the first few months, since this adds but little strain and removes the burden of pregnancy and labor. In this connection two points are worthy of emphasis: (a) The interruption should be accomplished at a single surgical procedure; either dilatation and curettage, or vaginal hysterotomy, to avoid prolonged



bleeding, infection or puerperal complications. (b) Repeated interruptions of pregnancy in the same patient are not justifiable. If it be proper to terminate one pregnancy in the interest of the mother, it is equally proper to prevent the occurrence of another which will carry the same or added danger. A preventive operation may be done at the same procedure as the interruption.

(6) If the pregnancy has passed the fifth month when the patient first comes under observation, the strain of premature labor and puerperium is nearly as great as that at full term and there is but a short period and relatively small risk in carrying the fetus to a stage of safe viability. It is therefore common to allow such women to go on to full term. When this is done there must be the closest cooperation between the physician and obstetrician. There must be all hygienic and constitutional measures for tuberculosis, conservation of maternal energy and prevention of toxemia, conduct of labor in such manner as to minimize suffering, prevent loss of blood, and avoid infection. Special care during the puerperium is necessary to see that involution is prompt and complete. To take the baby from the breast is commonly advised to avoid infection and to conserve the mother's energy.

Naturally close cooperation with a pediatricist is necessary. There should be no danger to a wet nurse and this method of feeding will add materially to the chances of success. Even though the patient pass through the puerperium with apparent improvement, one must not be deceived. She has yet to travel a rough and uncertain path.

LYCEUM BUILDING.

## OVARY CONTAINING ENDOMETRIUM\*

BY CHARLES C. NORRIS, M.D., PHILADELPHIA, PA.

**S**PECIMENS of ovaries containing aberrant portions of Müller's duct are not common and, apart from their infrequency, are of interest because they suggest a possible source for the development of some of the neoplasms which may arise in this organ. The presence of well-developed and apparently functioning endometrium within the ovary is a decided rarity. No extensive search through the literature, pertaining to this subject, has been attempted, however, in the study of some 7000 gynecologic specimens, no similar histologic anomaly has been observed. In 1899 Russell (Russell, W. W., Johns Hopkins Hospital Bull., Baltimore, 1899, x, p. 8) reported the history of a case almost exactly similar to the author's, except that, in his specimen the opposite ovary was the seat of a cystic carcinoma. Russell's case is admirably worked up and the various theories regarding the origin of such specimens are recorded in detail. It is to this excellent paper that the writer is indebted for much of the material in this article.

According to the Valentine-Pflüger conception the origin of the graafian follicle is due to specialized tubules, the Pflüger's ducts, formed by the germinal epithelium dipping into the substance of the ovary. Numerous other theories regarding the origin of the graafian follicle have been advanced from time to time. Waldeyer believed that the graafian follicle originated from nests of cells forming the germinal epithelium, these becoming isolated from their fellows by connective tissue penetrating the area from below and surrounding them. Waldeyer was the first to direct attention to the groove in the germinal epithelium which later becomes the müllerian duct. Nagel pointed out that the germinal epithelium at this point contained the so-called sexual cells which are the progenitor of the ovules in the female. He also demonstrated that in the further development of the müllerian duct the primitive duct closes at its distal extremity, forming a blunt tube which sinks into the wolffian body and pushes backwards beside the wolffian duct. The primitive duct remains entirely independent of the wolffian duct. The conclusion drawn is that the epithelium of the müllerian duct is derived from the germinal epithelium. If we accept Nagel's view it is not difficult to conceive that the portion of germinal epithelium which forms the ovary should, at times, attempt to produce structures, which its function elsewhere called upon it to do.

**CASE REPORT.**—This patient was twenty-eight years of age, married four years and had one child two years ago. The labor and puerperium were normal. Since the birth of her child there has been a moderate amount of leucorrhea, especially for a few days following the cessation of menstruation. It was usually white, but

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on one or two occasions had been yellow. The menstruation was regular, occurring every 28 days and lasting four or five days. The amount of blood lost was normal. There had always been a certain amount of dysmenorrhea of the congestive type. The pain came on a day or two before the appearance of the flow and disappeared after the first two or three days of bleeding. In addition to the dysmenorrhea there has been, since the birth of her child, more or less distress in the lower abdomen, which, on three occasions, had developed into definite attacks of pelvic peritonitis associated with nausea, vomiting, pain, constipation and other symptoms indicative of this condition. The last of these attacks occurred two months ago.

*Pelvic Examination.*—Examination showed the uterus retroverted and adherent, the ovary on the right side was adherent and tender and the left adnexa were somewhat enlarged and distinctly tender. A diagnosis of pelvic inflammatory diseases was made and operation advised.

*Operation.*—On opening the abdomen the uterus was found retroverted and adherent, the tubes had been converted into rather small and flaccid hydrosalpinges. The right ovary, although adherent, was in moderately good condition. The left was not only adherent but was the seat of a number of retention cysts. In freeing the adnexa on this side the ovary was somewhat torn and it seemed best to remove it. A bilateral salpingectomy, left oophorectomy, and suspension of the uterus was per-



Fig. 1.—Low power. Section taken longitudinally through the ovary. Two or three retention cysts are observed. At the junction of the largest cyst and slightly below the center of the ovary is a small flattened cystic space, which a high power view shows is lined by normal endometrium.

formed. The appendix was removed as a prophylactic measure. The patient made an uneventful recovery. The case was considered one of ordinary pelvic inflammatory disease until the histologic examination of the specimen was made.

*Pathological Report.*—The specimen consists of curettings, both tubes, the left ovary and appendix from what appears to be a case of mild pelvic inflammatory disease.

*Curettings.*—This consists of a moderate amount of, macroscopically, normal endometrium.

*Right Tube.*—The tube measures 12.5 cm. in length and has been converted into a hydrosalpinx, the greatest diameter of which is 1.6 cm. through the ampulla. The surface of the tube is congested and a number of veil-like adhesions are present. As a result of the adhesions the tube is somewhat bent upon itself. On section the walls are a little thickened, the lumen is patulous except at the extremities. It contains watery fluid. Before opening it is somewhat flaccid. The tube has been removed together with a wedge-shaped portion of the uterine cornu containing the intramural portion of the oviduct.



*Left Tube.*—This is similar in general character to the corresponding organ on the opposite side. It measures 12 cm. in length and has a diameter of 2 cm. through the ampulla, and although flaccid, is perhaps a little firmer than the right tube.

*Left Ovary.*—This measures 3x2x1.85 cm. It is the seat of three medium-sized retention cysts, the largest of which is in the outer pole and has a diameter of 1.2 cm. The surface shows the usual appearance of the normal tunica albuginea. It is congested and its anterior surface more or less covered by light adhesions. On section nothing further is learned. The retention cysts aforementioned are evidently follicular in type. A small and apparently normal corpus luteum is present. Macroscopically, the ovary resembles an organ, the seat of an ordinary perioophoritis with retention cysts, one of which has been torn during the course of its removal.

*Vermiform Appendix.*—This is 10 cm. in length and presents a few adhesions near the tip. It is otherwise normal.

*Histologic Description. Curettings.*—These present the usual appearance of endometrium in the interval stage. No evidence of inflammatory reaction is present.

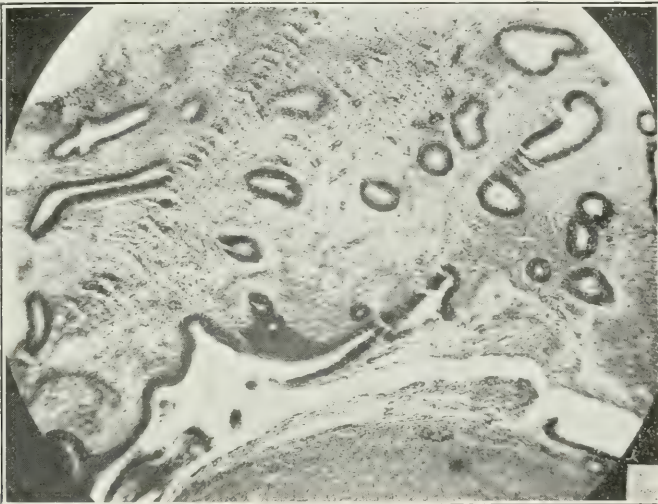


Fig. 2.—High power. This shows the endometrium within the ovary.

*Right Tube.*—Two sections have been taken, one through the isthmus and the other through the ampulla. Both show the usual evidences of a mild chronic inflammation. The surface presents a few adhesions. The serosa is slightly thickened. The muscularis is a little thicker than normal and, here and there, shows an infiltration of small round cells. It is perhaps somewhat more fibrinous than normal. The mucosa is thickened, the plica are slightly edematous and swollen. Their epithelium is intact and stains rather poorly, it is of the usual type found in this locality. The tips of the plica, in many instances, have become agglutinated, forming pseudoglands. The stroma of the plica is infiltrated with the products of chronic inflammation and the blood vessels are congested. The lumen of the tube is empty.

*Left Tube.*—This is similar in general characteristics to the right.

*Ovary.*—A section has been taken through the length of the organ. The inner pole presents nothing abnormal except the changes common to a perioophoritis. The surface shows a few adhesions. The capsule is slightly thickened. A medium-sized follicular cyst is present and a number of primordial follicles are observed. The periphery of the organ contains a few groups of small round cells and the blood vessels are somewhat engorged. A moderate amount of edema is present. The outer pole of the ovary shows the same general character as far as the inflammatory re-

action is concerned. In this area is the follicular cyst mentioned in the macroscopic description. Situated in what has been the inferior aspect of the ovary and in about the middle of the organ is a normal corpus luteum. Between these is a depression or groove in the surface of the ovary which was thought to be due to the junction of the corpus luteum and the follicular cyst. At this point the germinal epithelium can be easily recognized upon the surface. Just above this groove is a small cystic space about 3.5 to 4 mm. in diameter. This is surrounded by a layer of unstriped muscle, identical in character to the myometrium. This layer is about 0.5 mm. in thickness, the muscle fibers are somewhat loosely arranged and are less well defined in the lower or peripheral surface than on the other three sides of the cyst. Situated directly upon this layer of muscle and growing from it is a layer of tissue morphologically identical with the endometrium. This tissue lines the cystic space and is a little thicker on the side near the periphery of the organ than upon the other surfaces. The cyst itself contains free blood. The surface of the endometrium is moderately smooth but is, here and there, thrown up into small elevations. The surface as well as the glandular epithelium is moderately high and broad. The nuclei of the epithelial cells are oval, extending in the long axis of the cell. They are central or basal in location and take the stain deeply. Their protoplasm stains a faint homogeneous red and is slightly increased in amount. The cell outlines are sharp and distinct. The glands are of the interval type, as described by Adler and Hitschmann, and in many instances can be traced from the surface of the cystic space to the unstriped muscle. The lumens of the glands are for the most part empty although, here and there, a gland is observed which contains a few red blood corpuscles. The stroma corresponds to the interval type. A normal number of blood vessels are present in the endometrium and are of the type usually observed in this tissue during the interval stage. The cavity of the cyst contains free blood. There is no evidence of flattening of the epithelium lining this cavity as might be caused by intracystic pressure. This endometrium closely resembles that removed by curettage from the uterus in this case and is of the same stage, i.e., the interval type.

The interesting features of this case are that until the specimen was subjected to microscopic examination the true histologic character of the ovary was unsuspected. In viewing the clinical history it will be noted that the patient complained considerably of pain in the region of the ovary just before and during menstruation. This might well have been due to the inflammatory disease, but for the fact that the dysmenorrhea was of long duration, whereas the symptoms of the inflammatory disease appeared after childbirth and had a duration of less than two years. It is at least possible that the endometrium in the ovary may have contributed to the pain in the same manner as the endometrium in the deep muscular layers of a diffuse adenomyoma cause these tumors to become tense and painful at the menstrual periods. The fact that the endometrium in the ovary was of the same stage as that found in the uterus, i.e., interval, also tends somewhat towards this view. The presence of endometrial tissue in an ovary opens up new channels for theories of the histogenesis of ovarian tumors. Whether or not the opposite ovary contained endometrium is not known. However, this patient was seen a year and a half after her operation and at that time was without symptoms.

## REPEATED CESAREAN SECTION\*

BY PAUL TITUS, M.D., F.A.C.S., PITTSBURGH, PA.†

THE late effects of cesarean section are of importance from several aspects, and subsequent laparotomy for any cause affords an opportunity for their study. A repetition of the cesarean section not only permits observations on the general effects of the first section but also offers much of interest in itself.

Both gross and microscopic pathology resulting from the first operation may be studied, with all the bearing which this must have on the questions of whether one cesarean section necessitates others in subsequent pregnancies; whether the high abdominal incision of Davis<sup>1</sup> is to be preferred to the low incision insofar as the relative occurrence of adhesions is concerned; whether or not a woman should be sterilized after two or three operations, and if so on what account; whether or not the suprasymphyseal transperitoneal cesarean section (the Frank method of performing an extraperitoneal cesarean) which opens the lower uterine segment through an oval peritoneal orifice, causes such anatomic distortion as to preclude its being employed more than once. The likelihood of rupture of the uterine scar in subsequent pregnancies may be estimated from its appearance, and it should be of interest to know to what extent existing pathology is aggravated by repeated operations.

While it is realized that sixteen cases of repeated cesarean section are too few to warrant any definite conclusions, it seemed desirable to place on record the observations made while attending these patients, so that at some future time they might be compiled with those of others. A brief bibliography of similar work which has been used for reference in making this study, is appended.<sup>2-11</sup>

### DEVELOPMENT OF THE CESAREAN SECTION

Such extraordinary advance in surgical technic has been made since the time of Porro and Sänger, that the classical conservative cesarean is now a comparatively simple and safe operation. This is especially true when, for definite indications, the operation may be performed at an appointed time before labor has begun, or at least shortly after its beginning. Such circumstances are nearly ideal because every precaution can be thrown about the patient, such as the avoidance of vaginal examinations or ill-advised attempts at delivery.

\*Thesis submitted for admission to the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, 1920.

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It is unfortunate that, in spite of the development of aseptic surgery, the Porro operation still has its place in those cases where the necessity for cesarean section has not been recognized until after they have been grossly infected by meddlesome obstetrics or other neglect. The indications and contraindications for the classical cesarean section, on the one hand, and the Porro cesarean section, on the other hand, are so clear-cut and well understood that it is not necessary to enter into them in detail in this paper. Their fields are quite definite and should not overlap to any extent, but until recently there was no middle-ground between the two. In consequence of this, it is unquestionable that the limits of safety have often been exceeded in doing the classical conservative operation, while many uteri have been sacrificed by too great a caution, or fear of an infection which did not exist.

There are, however, many cases which do not fall into either category. A woman might have been examined vaginally several times, or it might have been desirable to give a patient a prolonged test of labor if her pelvis were only moderately contracted, or there might have been one or two attempts at the artificial delivery of a patient, all of which would increase the likelihood of contamination and infection, even though carefully done. Under such circumstances classical cesarean section is distinctly dangerous to a woman, even though the Porro amputation of the uterus might not be definitely required. A long list of similar possibilities and conditions present themselves readily to the mind and make this middle-ground a broad field.

The safety limits of the classical operation have been more sharply drawn, and at the same time, the need for the Porro operation has been limited by the revival by Frank,<sup>12</sup> in 1907 of the old extraperitoneal cesarean section. This operation has been modified extensively since that time, but as DeLee<sup>13</sup> states, all the modifications fall into two classes, the transperitoneal and the true extraperitoneal. Nicholson<sup>14</sup> points out that the term extraperitoneal cesarean section is taken simply to mean that the selected portion of the lower uterine segment through which the infant is to be delivered has been made extraperitoneal before its incision. Nicholson's review and descriptions of the various modifications of this operation are most complete, and for the details of this subject special reference may be made to his paper.

The suprasymphyseal transperitoneal cesarean sections referred to in this paper have been done according to the first technic of Frank, or the second method described by Sellheim which is virtually the same (*vide* Nicholson). In my cases this type of extraperitoneal cesarean section has been chosen whenever contamination, if not actual infection, was suspected. Either this or the Kroenig-Gellhorn operation is ideal for those patients with border-line contraction of the pelvis who have to be given a test of labor, and lately I have employed the latter on all patients

who have been in labor any considerable length of time, even though no vaginal examinations have been made. Morbidity undoubtedly increases in direct ratio to the length of time the patient has been in labor before operation, and the extraperitoneal cesarean offers the additional security that is necessary in these cases.

Briefly, then, it may be said that there are three main types of cesarean section available for three distinct classes of cases. The classical conservative cesarean section is still the most commonly employed, because of the comparative ease and rapidity with which it is performed, and also because the fundus of the uterus is the field exposed by this route, thus making this region available for any other necessary work such as resection of the tubes for sterilization, removal of fibroids, etc. The low, or cervical cesarean section of Kroenig and Gellhorn competes with the classical, except where it is necessary for the fundus to be exposed, and offers much greater security against seepage of lochia into the peritoneal cavity, against postoperative ileus, against adhesions, and against rupture of the uterus in subsequent pregnancies. This makes possible its employment with less strict limitation than the classical.

The extraperitoneal cesarean of Frank may be used with considerable assurance of safety where infection is merely suspected, or is likely to be low-grade in character, whereas, in the presence of actual infection there is no question but that the Porro amputation of the uterus should be performed.

#### REPORTS OF CASES

The sixteen cases to be presented separate themselves into four main groups, or classes, according to the nature of the surgical intervention.

The first group consists of those patients, ten in number, whose first and second operations were the classical cesarean section, and one patient who had had two classical sections and was being similarly operated upon for the third time. One of the first ten is now pregnant again. The second group is made up of three women whose first operation was an extraperitoneal cesarean section, whereas the second was a classical. A single patient had a classical cesarean section in one pregnancy and an extraperitoneal operation in her next labor. Still another patient had a classical cesarean section in her first pregnancy, and a rupture of the uterus near term in her second pregnancy, for which a supravaginal hysterectomy was done. For the sake of brevity the histories will be summarized and only the salient features presented.

##### Class I. Repeated classical conservative cesarean section.

CASE 1.—Mrs. M. S., gravida ii, white, aged twenty-six. Coxalgic pelvis. *Measurements*: Intersp. 25 cm.; intercr. 25.75 cm.; bitroch. 27.5 cm.; left oblique 22 cm.; right oblique 23.5 cm.; ext. conj. 20.5 cm.; diag. conj. approximately 11 cm.; conj. vera 9 cm. Right-sided coxitis; right thigh cannot be abducted, the head of the

femur being firmly ankylosed; the ileocepectineal line bulges into the pelvic cavity on the left side; subpubic angle narrow; oblique contraction of pelvic inlet.

*Obstetric history:* July 16, 1915. Classical cesarean section at term, after 8 hours of labor. Low vertical incision; afebrile puerperium; living child. Operation was done at another hospital because of which this record is not complete in details.

*Second pregnancy:* Second operation. Oct. 25, 1918. Classical cesarean section, resection of portion of tubes and stumps buried for sterilization. Operation was performed at appointed time, before beginning labor; high incision.

*Findings at operation:* Numerous dense adhesions between uterus and abdominal wall at site of first operation, which could not be freed; no thinning of scar in uterus. Puerperium uneventful except for elevation of temperature to 101 on two widely separated days. Living child.

*Final examination:* Dec. 14, 1918, approximately 7 weeks. Uterus poorly involuted and palpable above symphysis and to the right. Vaginal examination discloses adherence between uterus and scar of first operation; fundus drawn to right; no thickening of adnexa; cervix closed and high; vaginal canal lengthened by retraction upward.

CASE 2.—Mrs. P. C., gravida ii, white, aged twenty-three. *Obstetric history:* First pregnancy, breech presentation, manual extraction of dead baby followed by septicemia. *Measurements:* Intersp. 22.5 cm.; interer., 24 cm.; bitroch. 28.5 cm.; ext. conj. 17.5 cm.; diag. conj. 9 cm.; conj. vera 7 to 7.5 cm.

*Second pregnancy:* First operation; Oct. 24, 1917. Classical cesarean section at term, at appointed time before beginning of labor. High incision; living child; afebrile puerperium. *Third pregnancy:* Second operation; March 8, 1920. Classical cesarean section at term, before beginning of labor. High incision. *Findings at operation:* No adhesions; thick uterus; scar found with difficulty and excised for microscopical examination. Living child, uneventful puerperium. *Final examination, about 6 weeks:* Incision well healed; uterus involuted, retroflexed, but easily brought forward; no adhesions; adnexa free.

CASE 3.—Miss K. H., gravida i, negress, aged twenty. *Measurements:* Intersp. 23.5 cm.; interer. 25 cm.; bitroch. 29.5 cm.; ext. conj. 16.5 cm.; diag. conj. 9.5 cm.; conj. vera 7.6 (Skutsch) cm.; trans. of inlet 11.4 cm. (Skutsch); trans. of outlet 7.5 cm.

*First pregnancy:* First operation, April 28, 1913. Classical cesarean section at appointed time before beginning of labor. High incision; living child; afebrile puerperium. Positive Wassermann reaction (treatment). *Second pregnancy:* May 12, 1914. Miscarriage at 3 months. *Third pregnancy:* Second operation; June 21, 1916. Classical cesarean section at appointed time before beginning of labor. High incision. *Findings at operation:* Few fine omental adhesions; uterus free; scar plainly visible, but thick; no thinning of uterus in any part. Living child, uneventful puerperium. *Final examination:* About 3 weeks. Uterus well involuted for period of puerperium, anteflexed and freely movable, adnexa free.

CASE 4.—Mrs. W. G., gravida iii, white, aged twenty-two. *Obstetric history:* June 4, 1914; First child born after difficult labor; lived only a few minutes. Patient does not know whether delivery was instrumental or spontaneous. Dec. 4, 1915; second child, spontaneous delivery after long labor, lived 26 hours. *Measurements:* Intersp. 23.5 cm.; interer. 26 cm.; bitroch. 30.5 cm.; ext. conj. 17 cm.; diag. conj. 9 cm.; conj. vera 7 cm.

*Third pregnancy:* First operation; Dec. 20, 1916. Classical cesarean section at appointed time before beginning of labor. High incision; living child; afebrile puerperium.



*Fourth pregnancy:* Second operation; May 15, 1919. Classical cesarean section at appointed time before beginning of labor, resection of portion of tubes and stumps buried to effect sterilization. High incision. *Findings at operation:* No adhesions; thick uterus; scar represented only by thickened peritoneum. Living child; afebrile puerperium. *Final examination:* At about 5 weeks. Uterus well involuted and anteflexed; mobility slightly impaired; apparently no adhesions to fundus; adnexa free.

CASE 5.—Mrs. T. E. R., gravida i, white, aged twenty-three. *Measurements:* Intersp. 25 cm.; interer. 27.5 cm.; bitroch. 31 cm.; ext. conj. 17.5 cm.; diag. conj. 10 cm.; conj. vera 8 cm.

*First pregnancy:* First operation; Aug. 12, 1917. Classical cesarean section after 12 hours of labor without engagement. High incision; living child; mildly febrile puerperium; small stitch abscess in upper end of incision. *Second pregnancy:* Second operation; March 2, 1920. Classical cesarean section shortly after beginning of labor. Definite time had been set but patient went into labor. *Findings at operation:* No adhesions from previous operation, scar difficult to find, but dissected out for microscopical examination; uterus thick. Living child; febrile puerperium; temperature ranging up to 100.8° for two weeks. Small stitch abscess in upper end of wound. *Final examination:* About 8 weeks. May 8, 1920. Incision well healed; uterus high, but well involuted; evidently some adhesion formation holding fundus high, but apparently without attachment to abdominal wall; fair mobility; adnexa free.

CASE 6.—Miss I. B., gravida i, negress, aged twenty. *Measurements:* Intersp. 23 cm.; interer. 26 cm.; bitroch. 30 cm.; ext. conj. 15 cm.; diag. conj. 9 cm.; conj. vera 7 cm. *First pregnancy:* First operation; Jan. 25, 1914. Classical cesarean section after test of 8½ hours of first stage of labor without fixation of head. High incision; living child; afebrile puerperium. *Second pregnancy:* Second operation; Oct. 5, 1916. Classical cesarean section at appointed time before beginning of labor. High incision. *Findings at operation:* Few fine omental adhesions; uterus thick and firm. Living child; afebrile puerperium. No note on final examination.

CASE 7.—Mrs. W. D., gravida ii, white, aged thirty-six. *Obstetric history:* First pregnancy ended with long labor; high forceps; baby died on sixth day with symptoms of intraeranian hemorrhage. *Measurements:* Intersp. 22+ cm.; interer. 26+ cm.; bitroch. 29.5 cm.; ext. conj. 19.5 cm.; diag. conj. 11—cm.; conj. vera 9 cm. *Second pregnancy:* First operation; March 29, 1916. Classical cesarean section after 4 hours of labor with no tendency toward engagement of the head. High incision; living child; puerperium mildly febrile. *Third pregnancy:* Second operation; July 3, 1919. Classical cesarean section at appointed time before beginning of labor; resection of portion of tubes and the stumps buried for sterilization. *Findings at operation:* Loop of small intestine adherent to lower end of abdominal scar, narrowly escaped injury by virtue of fact that incision was made slightly to right of scar rather than directly through it. Adhesion resected and raw surface of bowel inverted; uterus thick and scar firm; many omental adhesions. Living child; afebrile puerperium. *Final examination:* At 5th week. No adhesions apparent; uterus well involuted, anteflexed, and freely movable.

CASE 8.—Mrs. J. A., gravida i, white, aged twenty. *Measurements:* Intersp. 23 cm.; interer. 26.25 cm.; bitroch. 28 cm.; ext. conj. 17 cm.; diag. conj. 9 cm.; conj. vera 7 cm. *First pregnancy:* First operation; July 9, 1917. Classical cesarean section shortly after beginning of labor (lateral and anterior overriding of head). High incision; living child; afebrile puerperium. *Second pregnancy:* Second oper-

ation; July 5, 1919. Classical cesarean section at appointed time before beginning of labor. High incision. *Findings at operation:* Uterus thick and firm; no thinning of scar; abdominal cavity free from adhesions. Afebrile puerperium; living child. *Final examination:* At 4 months. Nov. 24, 1919. Scar in abdomen firm and well healed; uterus anteфлекed but drawn to left; left tube thickened and tender. Patient complained of tenderness and fullness in left flank. Condition symptomatically relieved in ten days' time by employment of hot vaginal douches, and discontinuance of coitus interruptus.

CASE 9.—L. R.; gravida i, white; aged twenty-one. *Measurements:* Intersp. 26.5 cm.; interer. 27.75 cm.; bitroch. 32 cm.; ext. conj. 18 cm.; diag. conj. 10.5 cm.; conj. vera 8.5 to 8 cm. *First pregnancy:* First operation; July 6, 1918. Classical cesarean section after 17 hours of labor without fixation of head. Operation done by a colleague who employs low vertical incision. Living child; afebrile puerperium. *Second pregnancy:* Second operation, Nov. 8, 1919. Classical cesarean section at appointed time before beginning of labor. High incision. *Findings at operation:* Omentum adherent between uterus and abdominal wall with other adhesions at same site. Torsion of uterus and dense adhesions necessitated uterine incision well over to left. Scar in uterus not visible on account of adhesions, but apparently not thinned. Low grade elevation of temperature (99.5 to 99.8) up to fifth day. On this day the elevation went to 101.8, continuing in this neighborhood for nine or ten days, then subsiding gradually. Pyelitis was responsible for part of this fever. Living child. *Final examination:* At 4 weeks. Dec. 4, 1919. Cervix high; uterus well involuted, movable, not tender, and some thickening to the left. Abdominal wound well healed. Patient is now pregnant for the third time, but has not yet come to operation.

CASE 10.—Mrs. H. W., gravida, v, white, aged twenty-seven. *Obstetric history:* First pregnancy, 1912; miscarriage at 3 months. *Second pregnancy:* First operation; 1914. Classical cesarean section at another hospital after 14 hours of labor. Incision half above and half below umbilicus. Character of puerperium unknown. Child was puny and died at 9 months of pneumonia. *Third pregnancy:* 1916; miscarriage at 3 months. *Fourth pregnancy:* 1917; miscarriage at 3 months. *Fifth pregnancy:* Second operation; Admitted to Western Pennsylvania Hospital after having been in labor about 24 hours. Head unengaged. *Measurements:* Intersp. 24.5 cm.; interer. 28 cm.; bitroch. 30.75 cm.; ext. conj. 16.5 cm.; diag. conj. 10.75 cm.; conj. vera 8.5 cm.; trans. of outlet 10 cm. *Operation:* Classical cesarean section. High incision. *Findings at operation:* Scar in uterus visible and fairly thick; no abdominal adhesions. Infant was about two weeks premature, apparently suffering from atelectasis, and died shortly after birth. Syphilis suspected but not confirmed. Moderate postoperative atony of the intestines; febrile puerperium. *Final examination:* Aug. 20, 1919. Uterus well involuted, anteфлекed, freely movable, and adnexa free. Right ovary somewhat enlarged and tender. Abdominal wound well healed.

CASE 11.—Mrs. H. M., gravida iv, white, aged thirty-one. *Measurements:* Intersp. 23 cm.; interer. 25 cm.; bitroch. 30.5 cm.; ext. conj. 19 cm.; diag. conj. 10.25 cm.; conj. vera 8 to 8.5 cm.; trans. of outlet 6 cm.; subpubic angle very narrow; pelvic cavity narrow, funnel-shaped. *Obstetric history:* First parturition; 1917, in France; forceps, deep lacerations, baby badly bruised, lived 14 months, but was sickly from birth. Febrile puerperium, with phlebitis. *Second pregnancy:* First operation; 1910, in Panama. After an attempt to induce premature labor, at 8 months, by packing the cervix; the gauze being left in place for three days, a classical cesarean section was performed. Febrile puerperium with phlebitis. Child delivered prema-

turely, but survived. *Third pregnancy:* Second operation; 1915. Patient was staying at a popular sanitarium in an Eastern resort in this country, and at about the seventh month made plans to return to her home. The house physician decided that a cesarean section was necessary immediately "because the baby had pushed its elbow almost through the uterus." Classical cesarean was performed, and the tubes were ligated to prevent further pregnancies. The infant died soon after birth, being premature. *Phlebitis.* *Fourth pregnancy:* Third operation. Patient entered Hospital at about the thirty-sixth week of pregnancy, on account of the danger of uterine rupture, and because of pain and discomfort in the lower abdomen. May 29, 1918, a classical cesarean section was performed two weeks before term, at an appointed time. Tubes ligated; small portion excised and stumps buried to prevent further pregnancies. *Findings at operation:* No evidence of ligation of tubes in preceding pregnancy. Two distinct scars in uterus; uterine wall thinned out in region of former operations; many adhesions, both dense and fine, over uterine scars; lower abdomen filled with adhesions between lower uterine segment and both intestinal and parietal peritoneum, especially on the left side. Living child; acute postoperative dilatation of stomach and intestines which required active treatment for three days; febrile puerperium; recovery. *Final examination:* At 6 weeks. Abdominal incision well healed, uterus fairly well involuted, drawn to left with some fixation and considerable tenderness; some thickening on the left; adnexa tender on right but without thickening; general condition good.

Class II. Extraperitoneal cesarean section followed by classical cesarean section.

CASE 12.—Mrs. M. P., gravida iv, white, Austrian, aged twenty-six. *Obstetric history:* *First pregnancy;* stillbirth; instrumental delivery of large baby after long labor. *Second pregnancy:* Premature infant (8 months); spontaneous delivery; infant lived 16 days. *Third pregnancy;* parturition at full term, spontaneous delivery after long labor, moderate-sized baby which lived 48 hours. *Fourth pregnancy:* First operation; on admission Jan. 12, 1913 patient had been in labor several hours, during which time family physician had made several attempts at instrumental delivery and then tried to perform a version. Left mento-anterior variety of a face presentation. Head freely movable above the pelvic brim. Fetal heart sounds strong and regular. Patient's temperature 98.8 pulse 114. *Measurements:* Intersp. 24.5 cm.; intercr., 23 cm.; bitroch. 28 cm.; ext. conj. 16.25 cm.; diag. conj. 8 cm.; conj. vera 6 cm.; trans. of outlet 7.5 cm. Rachitic bony frame; square forehead; bowed legs; funnel-shaped chest. *Operation:* Extraperitoneal cesarean section (transperitoneal method of Frank), gauze drainage. Febrile puerperium for eight days; culture from cervix showed streptococci; deep infection of wound; recovery. Child in good condition on delivery. A forceps wound on the cheek developed into a gangrenous slough and the child died on the seventeenth day. *Fifth pregnancy:* Second operation; April 15, 1914; about three weeks before term patient applied for admission to the Western Pennsylvania Hospital because of fairly free bleeding. Examination disclosed a central placenta previa. Classical cesarean section performed immediately. High incision. *Findings at operation:* Abdominal cavity free from adhesions. Careful exploration of lower abdominal cavity showed no definite pathology. The line of reflexion of the peritoneum which had been made by the operation into a utero-parietal fold, was well up on the lower portion of the anterior surface of the uterus. This fold represented the peritoneal suture-line of the operation and extended well over into either flank, being almost ligamentous in formation. There was some density below its middle point, but there were no irregular masses. The bladder could not be palpated, the point of reflexion being highest just above the bladder region. Febrile puerperium beginning on the fourth day, continuing so for



nine days. Evidence of lighting up of old infection with some induration beneath scar of extraperitoneal operation. Considerable postoperative atony of bowels. Probably some pelvic peritonitis. Living child. *Examination on discharge:* About 4 weeks. Vaginal walls relaxed, cervix bears old lacerations; uterus poorly involuted, straight and high; fundus movable. Lower uterine segment adherent in region of first operation.

CASE 13.—Mrs. M. H. B., gravida i, white, aged thirty-five. *First pregnancy:* First operation; admitted March 20, 1916, after unsuccessful application of forceps and attempt at delivery by family physician at home. *Measurements:* Intersp. 26 cm.; intercr. 29 cm.; bitroch. 30 cm.; ext. conj. 18.5 cm.; diag. conj. 10 cm.; conj. vera 8 cm. Subpubic angle narrow; promontory of sacrum easily reached. Well marked lower uterine segment, Bandl's ring half-way to naval. Right position; head flexed, freely movable; lateral and anterior over-riding; fetal heart sounds 150 and of good quality. *Vaginal examination:* Marked edema of vulva and anterior vaginal wall, os about two to three inches in diameter; large caput succedaneum; unfixed head. Maternal pulse 112; temperature 98.8. *Operation:* Extraperitoneal cesarean section (transperitoneal method of Frank); living infant in blue asphyxia, but easily resuscitated. Gauze drainage through abdominal wound; suppuration of drainage wound (*B. coli communis*, streptococci and staphylococci). *Examination on discharge:* April 15, 1916. Uterus well involuted and movable; organ fairly low in pelvis but attached in lower segment. Cervix admits tip of finger; adnexa free; some thickening in abdominal wall at site of incision (transverse Pfannenstiell). *Second pregnancy:* Second operation; June 13, 1918. Classical cesarean section at appointed time, near term but before beginning of labor. High incision. *Findings at operation:* The abdominal cavity was free from adhesions. The line of reflexion of the parietal peritoneum from the surface of the uterus was high; the area over the bladder being fairly firm. The peritoneal fold formed by the suture-line extended well out into the flank on either side. No evidence of peritonitis having followed the first operation. Afebrile puerperium; living child. *Examination on discharge:* At 3 weeks, June 22, 1918. Uterus well involuted for this period of the puerperium; anteflexed; fundus freely movable; adnexa free; some fixation of lower uterine segment; no adherence of fundus to upper abdominal wound.

CASE 14.—Mrs. H. H.; gravida iv; white; aged twenty-seven. *Obstetric history:* *First pregnancy;* miscarriage at 3 months. *Second pregnancy;* May 7, 1913, forceps delivery after difficult labor, living child. *Third pregnancy;* Sept. 27, 1914, forceps delivery after long labor, living child. *Fourth pregnancy:* First operation; patient admitted to Hospital Oct. 6, 1916, after a diagnosis of face presentation. Forceps had been attempted in the patient's home, after which her physician tried to perform an internal podalic version. Both attempts failed, and upon admission the face was still presenting, with the chin posterior and impacted into the pelvic brim with a large caput succedaneum formation. Cervix almost completely dilated but not retracted, with edematous lips. Condition of both mother and fetus was good. *Measurements:* Intersp. 28.5 cm.; intercr. 30 cm.; bitroch. 33.5; ext. conj. 19 cm.; diag. conj. 10 cm.; conj. vera 8 cm. *Operation:* Extraperitoneal cesarean section (transperitoneal method of Frank). Gauze drainage. Living child. Febrile puerperium for six days. No record of final examination. *Fifth pregnancy:* Second operation; Dec. 14, 1918. Fetus in oblique presentation; head lower left quadrant; patient near term but not in labor. Classical cesarean section by high incision, portion of tubes excised and stumps buried for sterilization. *Findings at operation:* The findings in the lower part of the abdominal cavity were practically the same in this patient as in those of the two preceding cases. There was no evidence of

peritonitis having followed the operation, or was there any great anatomic distortion except for the high peritoneal reflexion from off the surface of the uterus at about the junction of the upper and lower uterine segments. The site of the incision into the lower uterine segment was dense and firm. Living infant; afebrile puerperium; patient discharged on seventeenth day. *Examination on discharge:* Dec. 31, 1919. Cervix high; vagina lengthened; uterus still large. Fundus to right and mobility restricted. Some fixation of the uterus to the lower end of the last incision.

Class III. Classical followed by extraperitoneal cesarean section.

CASE 15.—Mrs. P. P.; gravida vii; white; Polish; aged thirty-one. *Obstetric history:* First parturition; craniotomy on dead infant; second labor, decapitation; third pregnancy, miscarriage; fourth gestation, decapitation; fifth labor, decapitation; sixth parturition, brow presentation, forceps, died soon after birth. Details of these events were difficult to obtain on account of patient's imperfect knowledge of English. *Seventh pregnancy:* First operation; admitted to the Western Pennsylvania Hospital July 21, 1911, after having been several hours in labor. The record of this case is incomplete, but a classical cesarean section was done through a low incision by the then obstetrician of this Hospital. The baby was deeply asphyxiated, but resuscitated and did well for 36 hours, after which it began to fail and died on the third day. Febrile puerperium. *Eighth pregnancy:* Second operation; June 21, 1913. Patient sent to Hospital by a doctor who had applied forceps both before and after consultation with two other physicians. Fetal heart sounds about 170, slightly irregular and of only fair quality, becoming slowed at times. L. O. A. of vertex, head partly deflected, freely movable above brim. *Measurements:* Intersp. 30 cm.; interer. 31 cm.; bitroch. 32.5 cm.; ext. conj. 17 cm.; diag. conj. 8.5 to 9 cm.; conj. vera 6.5 to 7 cm.; Trans. of outlet 8 cm. *Operation:* Extraperitoneal cesarean section (transperitoneal method of Frank); stillborn infant, gauze drainage. Febrile puerperium for five days with slight suppuration of wound which disappeared promptly. Culture from cervix showed gram negative bacilli, while the incision showed gram positive cocci. *Examination on discharge:* About 3 weeks. Pelvic floor relaxed; stellate laceration of cervix; uterus fairly well involuted, in midposition, adherent near lower segment to anterior abdominal wall, tender, movable, no masses. Patient refused further attention, having become suspicious of our profession! The fundus of the uterus was not exposed in doing the extraperitoneal operation so that no conclusions can be drawn from this case regarding any pathology which may have existed as a result of the first operation.

Class IV. Classical cesarean section followed by rupture of the uterus.

CASE 16.—Mrs. M. H. C., gravida i, white, aged thirty-three. *Measurements:* Intersp. 24.5 cm.; interer. 28 cm.; bitroch. 33 cm.; ext. conj. 18.5 cm.; diag. conj. 10 cm.; conj. vera 8 cm. Admitted to Hospital early in March 1917, for pre-eclamptic toxemia. Fairly rapid improvement under treatment. *First pregnancy:* First operation; March 28, 1917. Classical cesarean section after 11½ hours of labor without engagement of the head. High incision. Vaginal examination had shown cervix to be 2½ inches in diameter. Child living. Patient nauseated and vomiting, definite postoperative ileus by evening. Complete relief from acute condition within 48 hours after delivery following appropriate treatment. Puerperium mildly febrile. *Final examination:* May 10, 1917. Abdominal wound well healed, uterus fairly well involuted, anteфлекed, freely movable, adnexa free. *Second pregnancy:* Estimated date of confinement in this pregnancy about June 18, 1918. Pregnancy without abnormality until June 2, 1918. At 3 A.M. on this date, patient was awakened by a sudden sharp pain in abdomen, accompanied by excessive fetal movements

which soon ceased entirely. Constant pain followed. No bleeding. Patient did not enter Hospital until noon, this being nine hours after onset, and was transported several miles from a nearby town, in an ambulance. *Examination:* Abdomen flat, very tender, fetal parts near surface and readily palpated, no movements or fetal heart sounds. Fluid dullness in flanks shifting with change in position of patient. Pulse 96, some pallor, leucocytes 16,000, red corpuscles 5,000,000, hemoglobin 80, urine negative. *Operation:* A diagnosis of ruptured uterus with extrusion of fetus into the abdominal cavity was confirmed by operation. Infant, placenta, and considerable blood mixed with amniotic fluid were found in the abdomen, while the uterus had contracted down so tightly as to shut off the bleeding points in the rent through which the uterine contents had escaped. The rupture was about two and one-half inches in length in the anterior wall of the uterus at the site of the cesarean section. Supravaginal hysterectomy was done, although the rent in the uterus could have been repaired. It was felt that this was the safest procedure rather than to submit this patient to a similar risk if she became pregnant again. The patient was returned to bed in excellent condition. Febrile puerperium for four days. The uterus showed no increase in fibrous tissue in the sections from the edges of the rent. It seems conclusive that the uterine wound had not united properly, and must have been thin, because the rupture included the entire scar and occurred while the patient was quietly resting, rather than exerting herself. This would indicate that this pregnancy had stretched the weak scar to the point where it could withstand no more tension. *Examination on discharge:* Stump movable, few posterior adhesions, pelvis free from masses. General condition good.

#### ANALYSIS OF CASES

*Indications for Operation.*—The invariable indication for operation in the cases reported, was dystocia due to contracted pelvis, so that the subsequent operation was as necessary as the first. The degree of contraction was moderate, or "borderline" in seven patients (six from Class I and one from Class IV), on which account these women were deliberately allowed to go into labor before their first cesarean section, in the hope that a few hours of first stage pains would either mould the head into the pelvis, or at least, that enough of a tendency toward engagement would be apparent to warrant a further test of labor.

*Time of Operation.*—Three women had their first operation done at an appointed time, before the beginning of labor; while a fourth, for whom this was planned, was operated upon shortly after the commencement of her labor. Reoperation was done at an appointed time, before the beginning of labor, in nine patients, shortly after the beginning of labor for one patient, and one other patient failed to enter the Hospital for her second cesarean until after she had been in labor for about twenty-four hours.

*Mortality.*—Nil. Eleven children were born alive by a first operation on my service. One that was delivered by extraperitoneal cesarean section after attempts had been made at instrumentation outside the Hospital, developed a gangrenous slough from a forceps wound on its cheek and died on the seventeenth day.

At reoperation, thirteen children were born alive, and survived. One



child died a few hours after birth (Case 10, a classical cesarean section), one child was stillborn (Case 15, an extraperitoneal cesarean section), and the child of Case 16, which was extruded into the abdominal cavity through a rent in the uterine wall, was stillborn.

*Morbidity.*—In studying the character of convalescence from cesarean section, the first ten cases of Class I may be compared with each other. Before their first operation six of these women were given a “test of labor” ranging from four to seventeen hours. Two of these women had a febrile convalescence; three of them were without fever, and the character of the puerperium of the other is not known. Four women of Class I, whose operations were done at an appointed time, made uneventful recoveries.

At reoperation nine of the original ten women were taken before their labor had begun, and one of them came into the Hospital after having been in labor 24 hours. Seven of the nine cases recovered without difficulty, while the last woman mentioned, as well as two others, had a febrile convalescence. One of them had a stitch abscess which accounts for at least part of her trouble, while the other was a patient whose first puerperium was afebrile but who had, nevertheless, a mass of adhesions between the uterus and the abdominal scar of a low incision.

Case 11 who had had two classical cesareans before the one reported here, was infected at each parturition, had an abdomen filled with adhesions, and there resulted either a reinfection or a lighting up of old infection of her last operation. A similar experience occurred with the patient (Case 12) who had had an extraperitoneal cesarean section followed by a stormy convalescence, to return in her next pregnancy with a central placenta previa. After reoperation there was evidence of a lighting up of the old infection with cellulitis beneath the original scar. It should be noted in this connection, however, that the other two cases in Class II (extraperitoneal followed by classical cesarean) made afebrile recoveries from the second operation in spite of the fact that there had been considerable local disturbance at the first.

The danger resulting from a “test of labor” and even a mild infection is emphasized by the patient (Case 16) who was allowed to be in labor 11½ hours, during which time I made a vaginal examination. Following a classical cesarean section, this patient’s puerperium was mildly febrile. She had, also, moderate postoperative ileus for the first two or three days which, probably, indicates that she had some peritonitis. Late in her next pregnancy her uterus ruptured through the scar of the first operation.

*Findings at Operation.*—(1) Adhesions: It was found at reoperation that six of the eleven patients making up Class I had abdominal adhesions. In two of these patients, the adhesions were fine and insignificant, whereas in one woman a loop of small intestine was attached to the

abdominal wall at the lower end of the scar. The remaining three women showed dense adhesions in the lower abdomen which were so located that they appeared to have resulted from the low abdominal incision which had been employed for their first operation. Two of the six had a febrile puerperium, and four of the six were given the "test of labor." On the other hand, one patient whose puerperium was febrile showed no adhesions. One case was particularly striking, in that a low incision had been employed and the patient made an afebrile recovery. At reoperation it was found that a mass of dense adhesions had formed between the uterine wound and the abdominal wound of the first operation. The adhesions could not be separated and a fresh incision was made into the uterus. The patient's puerperium following this operation, however, was stormy with elevation of temperature for days.

(2) Scar in uterus: The uterine scar was thick and plainly visible in six instances; found with difficulty in three; not visible on account of dense adhesions in one; and markedly thinned in one (Case 11). In one case it ruptured late in pregnancy. Microscopic examination of three scars, including that of the ruptured uterus, showed an increase in fibrous tissue in only one instance. There was no increase in fibrous tissue in the ruptured uterus, the scar having undergone muscular regeneration. Reference should be made here to the exhaustive work of Losee<sup>15</sup> in connection with the anatomic study of the cesarean section scar.

(3) Anatomic distortion after extraperitoneal cesarean section: The anatomic findings in these cases have been described in the case histories. I believe it would have been possible to have done another extraperitoneal cesarean section, in each case, through the scar of the first operation, probably without opening the peritoneal cavity. Great care would have been necessary, however, to safeguard the bladder.

A conclusion may be drawn from the three extraperitoneal operations described that this is the operation of choice when infection or contamination is suspected. The risk taken in not doing a Porro operation for each one of these scars, was greater, possibly, than it should have been, but the results obtained were satisfactory. Furthermore, a number of cases similar to these have done well in this clinic after extraperitoneal cesarean section. If infection is plainly evident, or a certainty at the time of operation, there is no question but that a Porro operation is imperative.

*Sterilization of patient.*—Sterilization has never been performed in this clinic at the first cesarean section, unless this method of delivery was chosen for the express purpose of accomplishing this on account of some such condition as kidney of pregnancy. Four of the sixteen patients were sterilized; three after the second and one after the third cesarean section. This was done by request for three of the women, whereas, it was advised for the fourth (Case 11). In retrospect; it may be said

that of the three, Case 1, required it most on account of adhesions; Case 4 deserved it because this was her fourth pregnancy, her second cesarean, and second living child. Case 7 did not actually require sterilization but earnestly desired it. She is the patient in whom the intestine was adherent to the abdominal wall and narrowly escaped being injured by the incision for the second cesarean section. It is a well-known fact that sterilization cannot be assured unless a small portion of each tube is excised, it being well to use the cautery for this purpose, after which the uterine end should be buried beneath the folds of the broad ligament. Mere ligation is not sufficient and this is well illustrated by the results following the ligation of the tubes of Case 11 at her second cesarean section. Nothing could be seen at her third operation which would indicate that the tubes had been tied off, and she was sterilized by proceeding in the manner described above.

*Findings at Discharge Examination.*—Five of the eleven patients listed in Class I showed evidence of impaired mobility and adhesion formation when examined for discharge. Three of the five cases were patients in whom this was to be expected, inasmuch as there had been adhesions resulting from their first operation according to the findings at reoperation. Two of them had been found free from this condition, so that the difficulty discovered at their final examination must date from their second operation.

#### SUMMARY

1. The method of cesarean section to be employed in a given case depends upon the conditions and circumstances surrounding the case. The choice may be made between the classical conservative cesarean, the low cervical cesarean of Kroenig-Gellhorn, the extraperitoneal cesarean of Frank, and the Porro cesarean section.

2. Good results follow the performance of cesarean section either before labor has begun, or soon after its commencement.

3. Repeated cesarean section is a comparatively safe operation if done under proper circumstances, both maternal and fetal mortality being low.

4. There seems to be a definite relationship between the occurrence of fever during the puerperium and the formation of abdominal adhesions.

5. "Test of labor" is often followed by a febrile puerperium.

6. Adhesion formation between the uterus and the abdominal wound occurred in each of the three cases in this series in whom the low abdominal incision was employed. Results in this respect from the high incision of Davis for classical cesarean section are greatly superior.

7. Careful coaptation of the edges of the uterine wound, from the endometrium out, will, in the absence of infection, insure a firm, thick union, in which there is a tendency to muscle regeneration.



8. Rupture of the uterus is a possibility in each repeated pregnancy, but is unusual unless there has been infection in the puerperium of a preceding pregnancy.

9. Extraperitoneal cesarean section is the operation of choice when contamination or infection is suspected. The anatomic distortion following this operation is not great, although quite definite.

10. Sterilization of a patient is inadvisable at the first cesarean section unless some special reason exists for it.

11. Sterilization after repeated cesarean section must depend upon the needs, pathologic and otherwise, of the individual case.

12. Mere ligation of the tubes is not sufficient for sterilization. A portion should be resected and the stumps buried to insure success.

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## OPPORTUNITIES FOR THE STUDY OF ADVANCED OBSTETRICS\*

BY A. M. MENDENHALL, M.D., INDIANAPOLIS, IND.

**D**URING the past decade much has been said and written relative to the teaching of undergraduate obstetrics and considerable progress has been made, but there has been little or no progress in the teaching of postgraduate obstetrics and the opportunities for the pursuit of advanced obstetrics have not been appreciably bettered.

The only apology for bringing out this paper is that the author has recently gone through the personal experience of trying to find opportunities of this kind and has been approached many times within the last few years by men seeking information as to where they might be able to make a deeper study into the intricacies of obstetrics. He has always been confronted with the one outstanding fact that the opportunities are exceedingly few and correspondingly difficult to obtain.

In approaching this subject I desire to arbitrarily divide the study of obstetrics into four general periods,—undergraduate obstetrics, junior obstetrics, senior obstetrics, and postgraduate obstetrics. This division is made purely for the sake of convenience in discussing the subject and with the full knowledge that there can be no absolute dividing lines but that one period merges imperceptibly into the other and that postgraduate obstetrics may be pursued at any time after the completion of the ordinary undergraduate course.

Some eight years ago Williams, of Baltimore, in writing on the mid-wife problem<sup>1</sup> rather boldly exposed some serious defects in the obstetrics of this country and two years later gave us a sad revelation of facts regarding our undergraduate instruction in obstetrics.<sup>2</sup>

Until the last few years it has been exceedingly difficult to place the department of obstetrics in our medical schools on the high plane it deserves. This has been partly due to the fact that the medical profession has been slow in its appreciation of obstetrics as a specialty, and partly due to the inability to secure and finance a large maternity to supply clinical material sufficient for a thorough course. However, these obstacles are rapidly being overcome so that at present a number of our medical schools have large maternities with indoor and outdoor departments extensive enough to furnish clinical material for very satisfactory undergraduate study. The doctor graduating from such a school should have at least sufficient knowledge of obstetrics to recognize his own limitations and be cognizant of when he should call in

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superior skill. As conditions now exist it remains a fact that a great many deliveries will continue to be made by the general practitioner and while it is just as obvious that we cannot make of him an obstetrician as it is that he cannot be a surgeon, our present hope should be that he be sufficiently trained in obstetrics to promptly recognize abnormalities and just as promptly refer the case to his especially trained colleague. When this day arrives, obstetrics will have taken long strides forward and the accidents, injuries, and deaths resulting from pregnancy, labor, and the puerperium will be greatly reduced.

The next step in the study of this subject might be called "junior obstetrics," or the training that is obtained by the hospital interne on obstetric service. Most of our general hospitals which maintain an obstetrical department furnish some opportunity to their internes to advance their knowledge in obstetrics but often this is quite insufficient in time and clinical material for a great amount of training. In contrast to this we now fortunately have a large number of high class maternities where one can secure an appointment as interne for three, four or six months and really get a most valuable training in obstetrics. Usually these services are divided into indoor and outdoor periods of about equal duration so that excellent training is secured in the handling of normal cases and opportunities offered to diagnose and recognize the abnormal ones. And the progressive student will here do a large amount of reading and reference work and thereby add materially to his knowledge of the theory of obstetrics.

It is exceedingly unfortunate that the average individual is so constituted that he rushes through his study of a normal case and longs to be permitted to handle the abnormal, all the time failing to realize that only in the examination and handling of large numbers of normal cases can he become skillful.

The ability to make a thorough and accurate antepartum examination can only be developed by a large amount of practical experience but the man who conscientiously applies himself to one of these junior courses in obstetrics and then goes out to do the obstetric work accompanying general practice will greatly surpass in skill and success his fellow practitioner who has been denied such a course. And such a man has approached the stage in the study of obstetrics where he finds it difficult to go further. One thing he can usually do is to duplicate his course in junior obstetrics and usually to a very distinct advantage if he desires to continue obstetrics as a specialty.

He is still in the stage where he needs to continue in large numbers of antepartum examinations, and in attendance upon normal cases until he has grown materially in his ability to recognize the case which is not normal. He will, no doubt, have seen many cases go on to spontaneous normal delivery which he at first thought were very unlikely to do so and with this experience it is to be hoped his furor operandi will have been checked and dampered. During this pe-



riod he should be a good listener and observer and watch the progress and conduct of the abnormal cases and do an abundance of reading.

Then comes the question which has stimulated the writing of this paper: Where may he pursue the subject further? He has reached the stage where he needs the opportunity to see and examine and diagnose, as well as to at least assist in the handling of a large number of abnormal cases, and this can be obtained in no place other than a large maternity. He should have under his close and continued supervision many abnormal cases and be able to follow them through their lying-in period and should also have a wide experience in early and late postpartum examination in order to familiarize himself with the results of childbirth upon the woman.

The very nature of obstetrical abnormalities is such as to almost preclude the possibility of a man becoming an efficient obstetrician merely by assisting even the highest class man in his private practice. The usual private practice, though it be quite extensive, does not include a sufficient number of abnormal cases to offer the best training.

Hence it becomes necessary to secure a connection with one of our large maternities and in a position which might be called senior resident or house surgeon, but the difficulty is that there are so few of these positions and so many applicants for them that many excellent men are turned away.

The author, in making a survey of the subject up to date, has written to most of the leading maternities in the country or visited them in order to determine definitely just what opportunities are available, and desires to mention a few of them and to show what is being done to better the situation.

New York City seems to head the list, as there we have the New York Lying-In, The Long Island College Hospital, The Manhattan Maternity, and the Sloane Hospital for Women. At the New York Lying-In there are two indoor house surgeons and this service is excellent. The appointment is usually given only to men of considerable previous surgical and obstetrical training and but rarely to one who has not had considerable previous service in the indoor and outdoor departments of that hospital.

The Long Island College Hospital has one resident in obstetrics and this is a most desirable position. Likewise the Sloane offers very good training to one or two men a year in advanced obstetrics. The Manhattan Maternity with its large facilities as yet offers very little more than an internship. Dr. DeLee informs me that the Chicago Lying-In has positions as resident physician open to two men each year and no doubt this will be a valuable service at least when the hospital becomes a charity institution as the indications are that it will soon. In this connection should be mentioned the service of the Johns Hopkins Hospital where there is an abundance of material also. The Committee on Medical Research of New York City has just formulated

plans for teaching advanced obstetrics. They will soon be able to handle four men each year, and as the appointments will be made only to men who have had considerable previous training in obstetrics, this is going to be a very distinct addition to our facilities. On the maternity service at the University of Pennsylvania there has just been added a year's residency, and with the vast amount of clinical material and teaching facilities there, this offers a valuable service.

Likewise in connection with the postgraduate school of the University of Pennsylvania, starting this year there will be given a rather comprehensive course in gynecology and obstetrics. Provided this offers a large amount of practical work, it should be a marked step forward, as it is something distinctly more than the usual so-called postgraduate course.

And this leads me to my fourth division in the study of obstetrics—namely, postgraduate obstetrics. Up to date there has been but little offered of real value in postgraduate instruction in obstetrics. There are a large number of places where such courses are offered and the only requirement for admission is usually the fee. They consist, for the most part, in a rather unsystematized course of lectures and clinics with little or no practical work, and are of value chiefly as a review. The man who knows a little obstetrics may at times pick up a few valuable points and the general practitioner may be able to learn of a few of the advances being made in the subject and sometimes takes the information back with a little profit to his patients. But beyond the possibility of a short review of obstetrics he has obtained little more than a rest from his practice.

The postgraduate courses in some branches of medicine are of a little more value than this, but in giving proper credit to this method of teaching advanced obstetrics, the author desires to quote from the recent address of the retiring president of the Clinical Congress of Surgeons of North America and in doing so to assert that what is said in this address on postgraduate work in general applies especially to obstetrics.

In this article Dr. John Clark, of Philadelphia,<sup>3</sup> in speaking of the conditions created at the close of the war whereby many physicians are looking for new fields, says that "to such men we should be prepared to offer ample facilities for postgraduate study, not of the old commercial type, such as our schools have been guilty of purveying in the past, but a full and comprehensive training of sufficient length to lead to a master's degree. The wretched postgraduate instruction of past years should be cast into the discard and courses should be arranged of such essential value that upon their completion by a student, his diploma, or certificate, will be a real and trustworthy evidence of his ability to practice in that special branch. The six weeks' or even the six months' course of previous years was little less than a "bunco" game, in which the postgraduate student was given a smattering imi-

tation of knowledge, and he in turn went into practice delivering the same deceptive article to his patients. It has been said that the patient who pays five or ten dollars as an obstetric charge is usually cheated, so likewise is the postgraduate cheated who takes a six weeks' postgraduate course, be his tuition fee small or large."

It is most deplorable to find that so many men who have "had a large obstetrical practice" in connection with a general practice go to some one of these commercial institutions, enroll, pay their tuition fees, sit on the benches a few weeks and go back home to do "obstetrics as a specialty". And this condition cannot be improved upon greatly until a few more opportunities for studying advanced obstetrics have been created similar to the few mentioned here. When the situation is gone over conscientiously, it is evident that only some eight or ten vacancies occur each year where really worth while work can be done and one must be fortunate enough to be one of the eight or ten selected or he is without a place to pursue his chosen work.

In closing it should be said that a ray of light is shed by the efforts being made in New York City by the Committee on Medical Research, also, though in a more embryonal stage, by the University of Pennsylvania. If these or other similar movements backed by the leaders in the profession of the city as these are backed can secure sufficient financial support to conduct large indoor and outdoor maternity departments then in addition will give the proper amount of time in actual teaching, they will grow rapidly and may soon offer many increased opportunities to the man desiring to go into obstetrics as a specialty.

The proposed movement in New York City is very comprehensive and carries with it the idea of sending their students around from clinic to clinic and thereby offers a distinct innovation which seems to be very promising. But there still remains a number of rather large maternities where it seems that a position of senior resident could be created with distinct advantage to the profession and to the credit of the institution and to the improvement of the care of the patients.

The country is now all too well supplied with places to see and listen, but the man in taking up advanced obstetrics, just as the man going into surgery, must have an opportunity to do some of the work himself. And until there is a very distinct increase in the number of opportunities to study higher obstetrics, we will still be met with large numbers of very poorly trained men who call themselves obstetricians.

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## CHOLECYSTOGASTROSTOMY AND CHOLECYSTODUODENOSTOMY\*

By W. WAYNE BABCOCK, M.D., PHILADELPHIA, PA.

THE internal drainage of the gall bladder by an anastomotic operation between the gall bladder and intestine was first performed by Winiwarter as a two-stage operation, the first successful cholecystoduodenostomy being credited to Terrier. With the introduction of the Murphy button in 1892, the operation acquired a transient popularity, the anastomosis being made to the stomach, duodenum, small intestine, or colon as was found convenient by the operator. Ill effects from technical errors and indiscriminate methods of anastomosis were observed and for many years the method has received comparatively little attention from surgeons. It is our impression that with the present development of satisfactory methods of intraabdominal anastomosis by suture, the operation has advantages that should give it a very prominent place in biliary surgery. Each year many reoperations are made necessary, many lives lost, because the surgeon in operating on the biliary system has not efficiently provided for the drainage of bile into the alimentary tract. The chief danger, that of an ascending infection of the biliary tract, is probably not very much greater after a well performed anastomosis than after a cholecystostomy. In about 130 anastomoses of the gall bladder performed by my associates and myself during the past four years, we have seen no case of secondary ascending infection of the biliary system.

Apart from the value of the anastomosis in the treatment of diseases of the biliary system, we wish to direct attention to the possible helpful influence of these drainage operations upon certain disorders of the stomach and upper intestines. Contrary to conventional opinion, bile is a normal fluid in the stomach and plays an important but poorly recognized part in gastric digestion. Its entrance into the stomach does not produce nausea or discomfort, but is associated with the cessation of gastric digestion and the arrest of motor activity of the stomach. Thus at the completion of each period of gastric digestion the pylorus normally relaxes, bile flows into the stomach and neutralizes and permanently arrests the activity of the acid pepsin in the chyme. The antrum of the stomach which has felt the brunt of the irritation of gastric digestion is coated with a protective film of the alkaline mucilaginous fluid, and the peristaltic movements of the stomach cease. We would term bile, therefore, the normal resting medium of the stomach. Were

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the action of the bile other than soothing, its normal presence in the stomach would not so uniformly coincide with the resting period of the organ.

Even in gastric disturbance with nausea and vomiting, the pylorus relaxes and bile pours into the stomach until the entire organ is coated and bile is ejected from the mouth. From the nauseous taste of the vomit, it is a common concept that the bile has disturbed the stomach, but it is much more logical to believe that the regurgitation of bile is a protective mechanism of nature, serving to neutralize the offending gastric contents and to soothe and quiet the irritated walls of the stomach. Blue litmus paper having been dipped in bile is more slowly and less intensely acted upon by acid chyme than the uncoated paper. In the duodenum and jejunum the protective influence of the bile and pancreatic juice is shown by many observations. Ulcers of upper intestine are exceedingly rare, except in the first portion of the duodenum, where there is the least opportunity for the neutralization of the chyme by the bile and pancreatic juice. If by operation, however, we reduce or eliminate the protective influence of the bile and pancreatic juice against the chyme in the duodenum and jejunum, ulceration becomes common.

Exclusive of nonabsorbable suture sinuses, gastrojejunosomy is followed by ulcer of the jejunum in about 2 per cent of the cases. When the bile and pancreatic juice are diverted from a segment of the jejunum, as by the Roux gastroenterostomy, the percentage of secondary ulcers greatly increases. In six out of seven dogs in which Exalto anastomosed the jejunum with the stomach after diverting the duodenal fluids in the colon, jejunal ulcers occurred. It is said that unlike gastrojejunosomy, gastroduodenostomy is not followed by duodenal ulcer. If the bile and pancreatic ducts are transplanted from the duodenum to the upper jejunum by operation, ulcers of the duodenum frequently follow. Therefore, whenever chyme from the stomach enters the upper intestinal tract without sufficient admixture with the bile and pancreatic juices, ulcers are prone to develop and there can be little question that the latter fluids normally protect the duodenum and jejunum from ulceration. As to the exact elements that cause the ulceration, free hydrochloric acid, acid pepsin, toxins in solution, bacteria or other agents; and the precise protective elements in the duodenal fluids, alkalies, mucus, nucleoalbumin, or other substance, we will not brook unproductive dispute by attempting to name. As surgeons, we think it unnecessary to enter the controversy as to whether or not peptic ulcers depend chiefly upon the hydrochloric acid content of the gastric juice. With such complex fluids it is unnecessary to assume that a single element is entirely responsible for any particular activity. Bread is equally nourishing to the man who does not fully understand its composition, and bile may serve the surgeon not versed

in its chemistry. It is important to know, however, that the so-called "peptic ulcers" have a geographical incidence corresponding to areas where the most active chyme has had the least admixture with the duodenal juices, and furthermore, that the operations that have best stood the test of experience in relieving these ulcers (gastroenterostomy, Finney pylorotomy) are those that best permit the access of duodenal contents to the area of ulceration. The drainage function of the new opening is often negligible. Moreover it is a striking fact that the efficiency of gastroenterostomy for ulcer shows a close relationship with the ease of access of the duodenal juices to the ulcerated area produced by the operation. Thus ulcers that lie out of the path of the fluids passing from the new stoma along the wall of the stomach to the duodenum, such as ulcers of the lesser curvature, in a much larger proportion of cases fail to heal after the operation, than ulcers about the pylorus. If it be true that it is chiefly the protective film of bile covering the mucosa that permits the average ulcer to heal, then we would suggest that the simple anastomosis of the gall bladder into the area of ulceration or into the area left after excision of the ulcer (cholecystoulerostomy) be substituted for the more formidable and difficult gastroenterostomy.

The advantage of such an operation lies not merely in the greater accessibility of structures to be anastomosed, but in the fact that the bile is directly delivered to the part where it is most needed, while the dangers of a secondary jejunal ulcer or the other complications of a gastroenterostomy are avoided. The continuous entrance of bile into the stomach does not necessarily produce symptoms. In Moynihan's case the jejunum, which had been lacerated by a gunshot wound, was closed and a gastroenterostomy done, and although all of the bile and pancreatic juice had to pass through the pylorus into the stomach then out through the new stoma, the boy developed normally and had no symptoms of indigestion. Patients who have had cholecystogastrotomy performed seem to be unconscious of the increased quantity of bile in the stomach. While the bile entering the stomach after a cholecystogastrotomy reduces the total acidity, it does not abolish gastric digestion by completely neutralizing the chyme. Although acid chyme is completely neutralized in the duodenum, Dunn's experiments show that the entrance of all the bile and pancreatic juice into the stomach will not completely alkalinize the gastric contents. Of course, the surgeon aims to protect only the irritated areas of mucosa, not to completely alter the chemistry of gastric digestion. Fortunately the normal tendency for the gastric contents to remain in well defined strata and for fluids entering from new openings to diffuse along mucous surfaces is of aid to the surgeon.

Does chyme enter the gall bladder after the anastomosis? Apparently not usually, for roentgenologic studies made in several of our



patients have shown no barium entering the new opening, although a large stoma had been made. In one patient reopened by Dr. Steel the gall bladder was found transformed to a narrow duct leading from the groove in the liver to the point of anastomosis.

While in some of the first operations an attempt was made to produce a valve which would prevent the entrance of gastric fluids into the gall bladder, this is now considered unnecessary, and we simply make a large opening with no attempt at valve formation.

Contrasting the postoperative symptoms following the internal anastomosis with those of cholecystectomy or cholecystostomy, we have been impressed in our small series by the easier convalescence, and the relative freedom from secondary symptoms after the internal anastomosis.

#### PHYSIOLOGY

Normally from 500 to 800 c.c. of bile passes into the duodenum daily. The flow of bile is stimulated by the presence of hydrochloric acid in the duodenum and by the absorption of secretin and peptone from the upper bowel. Each gush of acid chyme into the duodenum excites a reflex closure of the pylorus continuing until the ejected portion of chyme has been neutralized (Cannon), and probably also associated with an increased flow of bile due to a reflex contraction of the gall bladder and a relaxation of the sphincter of the common bile duct. The acid pepsin of the chyme on being neutralized is permanently inactivated. The bile also precipitates the proteins held in acid solution in the chyme.

#### INDICATIONS FOR CHOLECYSTIC ANASTOMOSIS

1. *In obstruction of the common or cystic duct that cannot safely be overcome by other methods.* Thus with a stone impacted in the duodenal portion of the common bile duct in an obese or aged person, the anastomosis is often much safer than the removal of the stone. Toxic patients with a purulent cholecystitis and a stone impacted in the cystic ducts after the manipulation and sudden relief of pressure attending the removal of the stone often develop a lethargic febrile condition and die. We believe that some of these patients may be saved by doing a simple anastomosis and letting the stone gradually and spontaneously work its way out through the new opening. The stomach seems to be well able to take care of the products of an infected gall bladder.

2. *In cholelithiasis when a secondary postoperative obstruction is feared.* In such a case the anastomosis provides a by-pass preventing secondary obstructive symptoms. Whenever the surgeon thinks there are residual or overlooked stones in the hepatic or common ducts the anastomotic operation is the preferable procedure to employ. Whenever continuous external drainage of bile is feared from a cholecystostomy the

anastomotic operation should be performed. It is our experience that patients who have lost all their bile through an external fistula for months are very bad operative risks.

3. *In case of jaundice when the cause of the jaundice cannot be located or at least cannot be removed.* Thus in cancer of the head of the pancreas, the operation is a palliative one. One of our patients with Hannot's cirrhosis of the liver has been relieved of the intense jaundice and other symptoms for three years following the operation.

4. *In perforation of the gall bladder when there is reason for not doing a cholecystectomy, or cholecystostomy.* The operation is safer than a suture of the opening and the convalescence more rapid than after a cholecystostomy.

5. *To avoid external drainage.* Thus with gall stones found accidentally in the course of an operation upon the stomach or abdominal wall where an external drainage would complicate the operation, the internal anastomosis has advantages.

6. *In perforated gastric or duodenal ulcer.* The gall bladder may be anastomosed over the perforation without constricting the lumen of the pylorus or duodenum, and the bile passing over the ulcerated surface may protect the ulcer, facilitate healing, and prevent recurrence and so render additional gastroenterostomy unnecessary. This operation has been carried out successfully in a single case by my associate Dr. Bower. In one case of severe recurrent bleeding from a gastric ulcer the hemorrhage ceased after the anastomosis.

7. *In gastric or duodenal ulcers a "cholecystoulcerostomy" or anastomosis between the gall bladder and the ulcerated area may be performed to permit healing and to prevent recurrence of the ulcer.* We have used the anastomosis to protect the suture line and prevent recurrence of the ulcer after a Finney pyloroplasty, a coat-sleeve resection of the stomach and after the simple excision of the ulcer. Our experience with 13 gastric and duodenal ulcers is too limited and too recent to be a basis for any dogmatic conclusion. We hope the value of the operation may be shown by a large experience.

The infrequency of carcinoma in alkalinized portions of the intestinal tract suggests that the anastomosis may be a possible prophylactic measure.

8. *In very obstinate hyperacidity and pylorospasm.* A cholecystogastrostomy may be considered if no definite causal factor is found.

#### TECHNIC

The anastomosis of the gall bladder with the stomach is easier than an anastomosis between the gall bladder and the duodenum. The anastomosis should not be performed with the colon or other bacteria-laden portions of the intestinal tract. The operation is readily done under local anesthesia and may be carried out with very little intraabdominal

traumatism or manipulation. As a rule the gall bladder is not separated from the liver and the anastomosis is made across the posterior portion of the fundus of the gall bladder. Upon the stomach the incision is usually begun two or three centimeters proximal to the pylorus and passes in a longitudinal direction across the anterior face of the antrum a short distance below the upper border of the stomach. The lines of the anastomosis having been decided, two guide sutures are introduced from two to five centimeters apart, to mark the limits and the direction of the necessary incisions. By traction upon the two guide sutures a fold of stomach and gall bladder is pulled into the wound, and with a 00 or 000 chromic catgut suture, the posterior or upper serous suture is introduced as in a gastroenterostomy. The gall bladder is then aspirated and opened on a line at least one centimeter distant from the first line of suture. A corresponding opening is then made in the stomach. The mucous surfaces are carefully united by a continuous suture of 0 or 00 chromic catgut which is continued entirely around the opening as in a gastroenterostomy. Clamps are unnecessary. All points of bleeding are carefully controlled and in some cases a third row of sutures is used to unite the muscular layers. The serous suture is then completed anterior to the opening, and if necessary several additional supporting sutures are applied. It is very important that the outer sutures do not penetrate the gall bladder. The omentum is usually laid over the line of anastomosis and the wound closed without drainage. In no case have we had secondary intraabdominal leakage of bile.

#### RESULTS

In about 60 personal cases of cholecystogastrostomy and cholecystoduodenostomy there have been six deaths. Two deaths occurred from associated myocardial disease, one from acute necrotic pancreatitis for which the operation had been performed, one was from an associated advanced pulmonary tuberculosis, one from cholemia from a very septic gall bladder, and one in a case of chronic nonobstructive jaundice, after reoperation for secondary hemorrhages from the stomach or intestine.

No death occurred in any uncomplicated case. Two of the patients were over 70 years of age, several were over 60, a number had purulent forms of cholecystitis, two had pancreatitis, while thirteen had chronic ulcers of the stomach or duodenum. Our experience is too meager to contrast results with those from gastroenterostomy.

The ease of the procedure, the usual rapid convalescence, freedom from complications, and relief from symptoms, should, we believe, encourage a wider trial of the operation.



## SIGMOIDOUTERINE FISTULA, WITH REPORT OF A CASE\*

BY WALTER C. G. KIRCHNER, M.D., F.A.C.S., ST. LOUIS, MO.

THE occurrence of a sigmoidouterine fistula is so rare that even a brief account of this condition should prove interesting. In looking up this subject one is struck by the fact that fistulæ of this type are not mentioned in the ordinary text books on surgery, gynecology or obstetrics, and a survey of the literature shows that even intestinouterine fistulæ are of rare occurrence. These fistulæ have been associated with pregnancy and their formation must be considered one of the complications of childbirth.

Intestinouterine fistula has occurred as the result of a cancerous or a tuberculous process, in pelvic abscess, in traumas of, or instrumental perforations of the uterus, and as one of the accidents or sequelæ of childbirth. It is in the latter condition that we are particularly interested, and a brief recital of the history of a case that was referred to me, is as follows:

The patient, Mrs. B., age thirty-six, of average stature and weight, was usually in good health and was able to attend to her household duties. Concerning her first pregnancy, only meager information was obtainable; but it was stated that the delivery of the child was difficult, that forceps were used, and that the child was dead or died soon after birth. The patient became pregnant a second time and when in labor, Jan. 4, 1909, a physician was called and again it was found necessary to resort to instrumental delivery. Craniotomy was performed and the uterus was emptied of its contents. The patient recovered and there were no unusual complications following the extraction of the child.

On March 16, 1913, the patient, in labor for the third time, sent for her former physician. On arriving at the patient's home he learned that the pains had started at 2 P. M., March 15, and by 5 P. M., March 16 but little progress had been made; the pains were ineffectual, and the patient had become quite exhausted. At the examination it was found that the presenting head was high in the pelvis and, presumably, the bag of waters had ruptured some time previously so that, in effect, he was confronted with a dry labor. Instruments were employed to assist in the rotation of the head, and even after repeated application of forceps, the patient being anesthetized, it was found impossible to deliver the child. A skilled obstetrician was called into consultation, and the child being dead craniotomy was performed. It was stated that this latter procedure was carefully done and that no undue injury was done to the soft parts while this operation was in progress. The patient recovered nicely from the operation, and on the following day, March 17, her condition was very good. On March 18, the patient was feeling well and, without any warning, there was a sudden "explosion" and a considerable quantity of gas was passed through the vagina. Subsequently, fecal matter was also passed through the vagina.

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On the two following days the condition remained unchanged. The patient had no great discomfort, and at no time was the temperature over 100° F.

On March 21, she was sent to the hospital. Examination revealed that the discharge of fecal matter came from the cervix, though the location of the opening in the bowel was not discovered. The patient was placed on a restricted diet and the expectant treatment decided upon. Except for the presence of the fecal fistula, the patient showed general improvement.

On April 18, a proctologic examination was made and it was believed that the opening in the bowel was high up in the rectum. The patient was able to be up and about; but, naturally she was very anxious to be relieved of her condition since practically all of the fecal matter was discharged through the vagina, very little if any stool passing through the anus. The writer saw the patient at the hospital, May 16, and on the next day the following condition was found upon examination:

There was a fecal discharge from the vagina. All wounds of the vagina, such as follow delivery, were healed. Through the speculum it was noted that the external os was open, moderately lacerated, and that fecal matter came through the cervical canal. The cervix was adherent at the posterior portion. There was no pus; neither were there signs of inflammation. By digital examination the uterus was found slightly enlarged, adherent posteriorly at the cervical portion, though the fundus was slightly movable. The adnexa were free. The rectum was examined digitally and with the proctoscope, and even with the use of the sigmoidoscope the writer was unable to find the opening which communicated with the uterus. The character of the fecal matter indicated a fistula of the large bowel, and a tentative diagnosis of sigmoidouterine fistula was made and an operation for the cure or relief of the condition was recommended. During the four days preceding the operation the patient was given liquid diet and the rectum, vagina, and external parts were kept in a healthy condition by means of cleansing enemas and washes.

*Operation.*—On May 22, 1913, it was decided to attack the fistula by the vaginal route, and by laparotomy if necessary. Ether anesthesia was administered. The rectum and vagina having been well cleansed, through the posterior vaginal fold a dissection was made to expose the posterior wall of the cervix. The dissection was carried up as far as the fistulous tract which was loosened up and made as free as possible on all sides. The opening through the posterior vaginal wall also gave access to the culdesac of Douglas, and permitted digital examination of the abdominal portion of the fistula. Laparotomy was decided upon after a Fenger probe was inserted through the fistula into the intestine.

*Laparotomy.*—Left rectus incision. The uterus was somewhat enlarged and about the size of a man's fist. Tubes, ovaries and broad ligaments were normal but flaccid. The sigmoid flexure of the colon at a point a little below the middle portion was adherent to the uterus. There was no pelvic peritonitis and there were no adhesions aside from those taking part in the fistula. The condition resembled a lateral anastomosis of the sigmoid with the uterus, both loops of the bowel being free. The loop of sigmoid was dissected free from the lower portion of the uterus, and the opening in the bowel was closed with a double row of sutures. The opening in the uterus involved mostly the cervical portion, and this was closed, through the laparotomy opening, by means of deep and superficial sutures. Three small subserous fibroids were also easily removed. A cigarette drain leading into the vagina was placed in the culdesac. There being no special complications, the abdominal wound was closed in layers. The patient was given the usual postoperative care. On the sixth day the laparotomy wound showed some infection so that a portion had to be opened for drainage. The vaginal drain was also removed. A Bartholin gland on the right side showed enlargement.

On June 20, all wounds were healed. The uterus was of nearly normal size, and movable. The cervix and external os were large and there was a slight thickening of the posterior part of the cervix where the repair had been made. Slight infection of Bartholin gland on right side was still present. Bowel movements and defecation were normal and painless. When the patient left the hospital she was happy and contented, her distressing condition having been relieved. In the following year she went to Europe, returning, however, before the outbreak of the war. Menstruation has been normal, and five years after the operation she was in good health.

The question which naturally arises is: What was the cause and manner of the formation of the intestinouterine fistula? Was it due to the trauma of instrumental delivery, to perforation, or to impaction and pressure necrosis? In several of the reported cases the complication followed instrumental delivery. Loenne<sup>13</sup> reports a case in which the woman was in labor for nearly two days, the bag of waters rupturing at the end of the first day. When the pains grew less effective, the physician finally applied high forceps. A living child was delivered. On the third day there were signs of infection, the patient later becoming septic. There was pus in the stools. The patient died and at the autopsy two perforations were found in the cecum as well as a perforation in the posterior wall of the uterus. There were feces in the pelvis and a widespread peritonitis. He quotes Franqué's case which was similar, there being likewise a perforation in the posterior wall of the uterus near the cervix.

In a case reported by Le Jemtel<sup>12</sup> a physician had been called in one and a half months after delivery when signs of infection had developed. He performed curettage and there was some improvement for a few days. The fever returned and shortly thereafter there was a discharge of feces through the cervix. There was also pus in the urine, and a purulent vaginal discharge. Intrauterine irrigating fluid soon passed through the anus. At operation an abscess was encountered which communicated with the bladder. The opening in the bladder was repaired and the cavity drained. The rectal opening closed spontaneously.

Graves<sup>9</sup> reports a case in which after forceps delivery there was perforation of the fundus of the uterus and prolapse of the small bowel into the vagina. The section of bowel had been removed, but there was discharge of feces through the vagina.

Petit<sup>17</sup> had collected up to 1882, 18 cases of intestinouterine fistula, but the cases occurred as complications of pregnancy and the manner in which these fistulae are produced has not been satisfactorily explained. Where perforation is due to instrumentation the explanation is clear. In a number of cases associated with delivery, as in our own case, the perforation was at the posterior part of the uterus. It is hardly likely that in the application of forceps the instrument would cause injury to the posterior part of the uterus. A plausible explanation may be found in the fact that the fistulae occurred in difficult



labor cases. It is quite possible that the head not having rotated, became impacted between the symphysis pubis and the promontory of the sacrum. Should by chance a mobile cecum or a loop of the sigmoid in such an instance be caught between the promontory of the sacrum and the uterus, undue and prolonged pressure would cause a necrosis of the uterus as well as the bowel. Adhesion of the bowel to the uterus may readily form and, in the favorable cases when the tissues break down, a fistula may be established between the bowel and the uterus. It is probable that such a process took place in our own case, since there was no pelvic peritonitis.

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## Case Reports

### LATERAL PARTIAL GLANDULAR HERMAPHRODITISM.\*

BY CHARLES W. MOOTS, M.D., F.A.C.S., TOLEDO, OHIO

IT has not been so many years since the sex of an individual was determined by the appearance of the external genitalia. Many of us recall the annual pilgrimages to our medical colleges of a certain individual who would, for the privilege of taking up a collection, demonstrate to the class the peculiarities of an hermaphrodite. As we recall our own impressions, it occurs to me that very little, if anything, of value was gained by these demonstrations; in fact, rather are we led to believe that these demonstrations had a tendency to prevent the subject of hermaphroditism from being discussed in scientific meetings. However, as recent events have added greatly to our knowledge of the close relationship between the endocrines and gonads, and of the very close relationship between all of these glands, and the personal characteristics of every individual, I desire to present to this Association the history of a case that has been of exceedingly great interest to myself as well as to several confreres.

Mrs. O. I., aged twenty-seven. Referred to me on Feb. 8, 1916, by a dermatologist on account of uncontrollable hypertrichosis. She is refined and well educated, and the wife of a college professor.

*Family history.*—Negative as to malignancy and tuberculosis as well as to any particular tendencies to other diseases.

*Past history.*—Had usual diseases of childhood. First menses at 13; her periods being normal for a number of years. At 19, she became very nervous, lost weight, and was forced to quit college. At the age of 20, she had one very severe uterine hemorrhage following immediately upon a normal menstrual flow; this occurred in Louisville where she had gone to consult a neurologist. Normal menstrual periods were established and continued for eight months, after which time the periods were irregular, decreasing in frequency, and amount of flow. She married in August, 1910, at the age of 21. The menstrual periods grew progressively less frequent and the flow less in amount, until four years previous to this examination it ceased altogether and complete amenorrhea has existed since that time. Following this cessation of the menses, her general health improved and she gained rapidly in weight. However, at the same time, she began to develop the hypertrichosis which has been gradually increasing, the growth of hair now being quite generous in amount over the face, arms, chest, and legs.

*Present illness.*—Comes on account of the growth of hair on the face, as well as an amenorrhea which has persisted for four years. Has been forced to use depilatories or the razor on the face every second day.

*Examination.*—Height 5 ft. 7 in. Weight 153 lbs. Blood picture, including the

\*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

hemoglobin, is normal. Blood pressure normal. Teeth and throat negative. Voice rather deep in tone. Chest and abdomen negative. The clitoris is much enlarged and is one inch in length. The other external genitalia are normal, also the vagina. Uterus is slightly enlarged but normal in position. Right adnexa normal. To the left of the uterus, a solid mass apparently three inches in diameter can be made out. Otherwise, the pelvis is negative. The distribution of hair over the body is abundant and decidedly of the male type, this being particularly true of that over the face, chest, limbs, and mons veneris; the latter presents the well marked male triangular arrangement with the apex of the hairy triangle at the umbilicus. All nervous reflexes are normal. The thyroid gland was normal in size. X-ray examination shows the thymus to have undergone normal atrophy and the sella turcica normal.

*Diagnosis.*—At the outset, we felt that we were dealing with a case of endocrine dysfunction and after careful study decided that there was, at least a relative hyperactivity of the cortex of the suprarenals.

*Treatment.*—Ovarian and thyroid extracts were immediately started, the thyroid being gradually increased until the patient showed all the well marked symptoms of

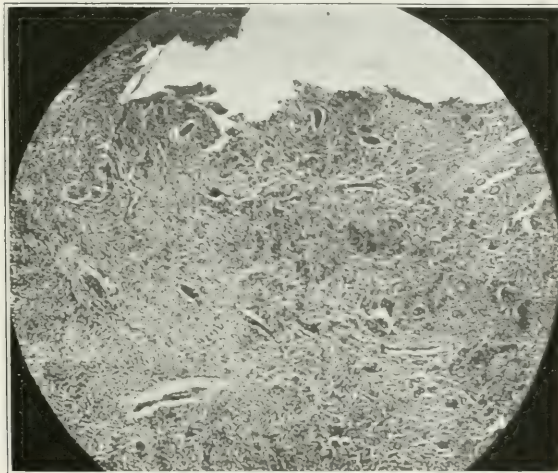


Fig. 1.—Low power, showing numerous tubules.

thyrotoxicosis without exophthalmos. During the month of April, the patient felt that she would surely menstruate but had no "showing" except a profuse leucorrhea lasting four days. Early in May, all treatment was stopped soon after which the patient returned to her usual appearance and feelings. At this time, the patient was examined by Dr. Theodore McGraw, Jr., who not only concurred in the diagnosis but also in our previously taken position that an exploratory operation be done, that the character of the pelvic tumor might be definitely determined. This was not accepted by the patient until Jan. 9, 1917, when, under gas-oxygen anesthesia by Dr. McKesson, abdominal section revealed a solid tumor of left ovary, this being at once removed together with the left tube. Right ovary and tube appeared perfectly normal and were not disturbed. Palpation of suprarenals from the peritoneal cavity revealed no abnormalities. Appendix removed and the abdominal wall closed in layers. Pathologist reported the tumor to be fibrosarcoma.

*Subsequent history.*—The convalescence was uninterrupted except for a follicular tonsillitis which started just after her return to her home, two and a half weeks following the operation. On the 28th day following the removal of the tumor her menses started and the flow continued throughout the year. Several let-



ters received during the year 1918 while we were engaged in military service, conveyed the happy news that the patient was quite well. Menses normal, and the hair becoming much finer and softer as well as much slower in growth. On Feb. 8, 1919, the husband reported to me that the patient, who had accompanied him to Boston where he was in Army service, contracted influenzal pneumonia and died during the third day of the disease.

Some little time after my return from the service in the Navy, my attention was attracted by a case report in a new publication by Blair Bell of London. His case was strikingly like my own even to the point that his pathologist reported the tumor to be one of malignancy of the ovary. The subsequent history of his case led him to suspect that the tumor might be an ovotestis. After a study of many sections, he was rewarded by absolute proof that his suspicions had become facts, and that the patient had a typical right ovary, while the left gonad was an ovotestis. This evidence together with the interesting history of our own case, caused us to again start

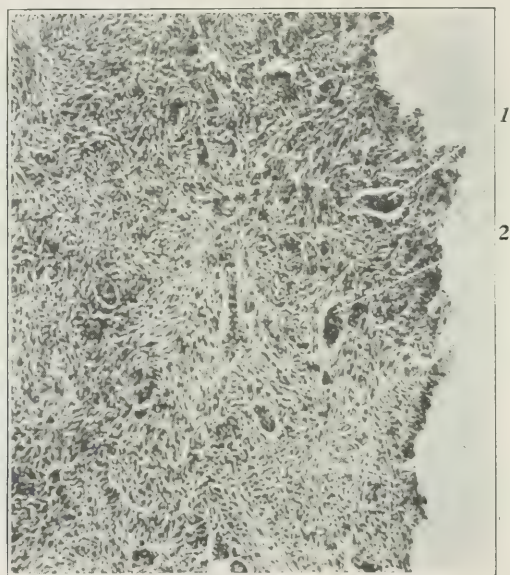


Fig. 2.—Medium magnification, 1 and 2 being examples of tubules.

an extensive microscopical study of the tumor, which had been preserved, and the following report was recently received from Dr. Ramsey, pathologist to Flower Hospital.

Fibroblastic sarcoma of embryonic testis. Gross description. Growth removed from region of left ovary. Oval shaped mass about the size of a large orange. Consistency firm—coverings serous and fascial in type. Upon cutting shows fibrous stroma, bundles arranged in whirls and sheaths; presence of ducts and small blood vessels seem to be surrounded and walled by stroma only. Color, pinkish yellow. Several small smooth plaques are found in different parts of the mass situated toward the center and where the fibrous tissue is not discernible. Sections were made from cortex, center of growth, through region surrounding ducts and through several small smooth areas.

Microscopic description. 1. Section through cortex. Fibroblastic spindle cell sarcoma, the cells arranged in bundles and whirls lying closely packed in a very faint fibrillar stroma. A few blood spaces, the walls of which are formed by these sar-

coma cells only. Trabeculae of true fibrous tissue traverse the section, separating the spindle cell bundles. No definite stroma resembling either testicular or ovarian tissue was found in any cortical section. Serous and fibrous tissue coverings not invaded by sarcoma cells; mass seems entirely encapsulated. 2. Section through center of growth and region of ducts. Fibroblastic sarcoma cells separated by fine fibrillar network and arranged in bundles separated by trabeculae of connective tissue containing lymphatics, blood vessels, and occasionally ducts. Among the sarcoma cells bundles of denser cells with dark staining nuclei form indefinite tubules. Some of these seen on cross section resemble cell masses. These cells are embryonic in type, and no basement membrane can be distinguished. 3. Section through one of the smooth plaques. Fibroblastic sarcoma cells lie closely packed and surrounding tubules resembling embryonic testicular gland tubules. These seem almost completely obliterated by the invasion of the sarcoma cells, but, here and there, a definite open

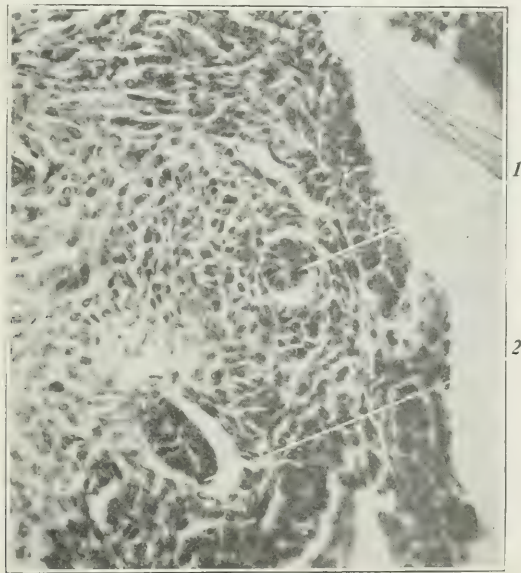


Fig. 3.—High power, 1 and 2 showing tubules.

tubule is found lined by a single layer of low cuboidal cells, some of these in cross section, others cut longitudinally.

“*Summary.*—Fibroblastic sarcoma of embryonic testis. The mass may have been an ovotestis with the ovarian stroma completely obliterated by sarcomatous process.”

#### COMMENT

From the clinical history as well as the pathology found, I feel it reasonable to conclude that this patient should be classified as a lateral partial glandular hermaphrodite, having a normal ovary on the right, and a testicle or an ovotestis on the left side, the sarcomatous degeneration preventing a positive determination of the latter propositions. As far as I am able to learn, this is the only case in which surgical procedure was followed by a complete return to the female type, after having taken on such marked male secondary sex characteristics.

225 MICHIGAN STREET.

## A POLYCYSTIC KIDNEY OF AN ATYPICAL CHARACTER\*

BY LEROY BROWN, M.D., NEW YORK, N. Y.

BRAASCH, in a paper on "Clinical Data of Polycystic Kidney", read before the Association of Genito-Urinary Surgeons, in 1916, presented the clinical findings of forty-one cases, in which exploratory operations had been done in the Mayo Clinic. Twenty-six cases were diagnosticated as such before operation. Among the symptoms associated with this form of kidney degeneration he accentuates *pain*, *hematuria*, and evidence of *renal insufficiency*, together with increased blood pressure.

Pain over the diseased kidney varies greatly and is dependent in part on the presence or absence of urinary infection, due to the lack of complete drainage from the distorted kidney pelvis. It is also influenced by the extent and degree of the cystic change in the kidney, resulting in a greater or less pressure on the intervening kidney structure and cortex.

Hematuria, he states, occurred in 40 per cent of the cases and varied in duration from that of an occasional occurrence lasting a few days to that of several months duration with continued bloody urine. He explains the occurrence of hemorrhage as due to a rupture of capillaries within the cyst cavities and the subsequent emptying of the contents of such hemorrhagic cysts into the pelvis of the kidney.

The involvement of one or both kidneys at the time that the patient comes under the care of the physician will determine the degree of retention toxemia of the patient. While the condition is regarded as practically an interstitial nephritis, usually advanced more in one kidney than the other, Braasch points out that in most instances the first evidence of renal disturbance and occasionally the only evidence, extending over a period of several years, is nausea and vomiting. He also states that these symptoms alone were present in six out of nine cases, though all showed evidences of renal insufficiency.

Attendant cardiac disease is rare and then only as an end result. None of his cases presented any edema of the extremities.

The case coming under my care and reported herewith, is as follows:

Mrs. E. W., colored, age twenty-four and married, was admitted to the Woman's Hospital December 6, 1919. She had one child, two and one-half years old, and has had two miscarriages, each two months, advanced: one in June, 1918, and January, 1919. No previous illness. She had some pelvic pain at the time of menstruation, also a uterine discharge, apparently referable to the previous miscarriages.

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\*Read in part before the New York Obstetrical Society.



Her chief complaint, however, was pain over the left lower quadrant. This existed for the past year and became worse during the last six months, especially on physical exertion. The patient was habitually constipated. She gave no history of prolonged gastrointestinal disturbances. She had recurring painful urination for the past six months and stated she had bloody urine six months ago, which continued for a week.

*Examination.—Pelvic:* A minor laceration of the cervix and perineum; uterus forward. A mild degree of endocervicitis. Both fornices free and the adnexa cannot be felt.

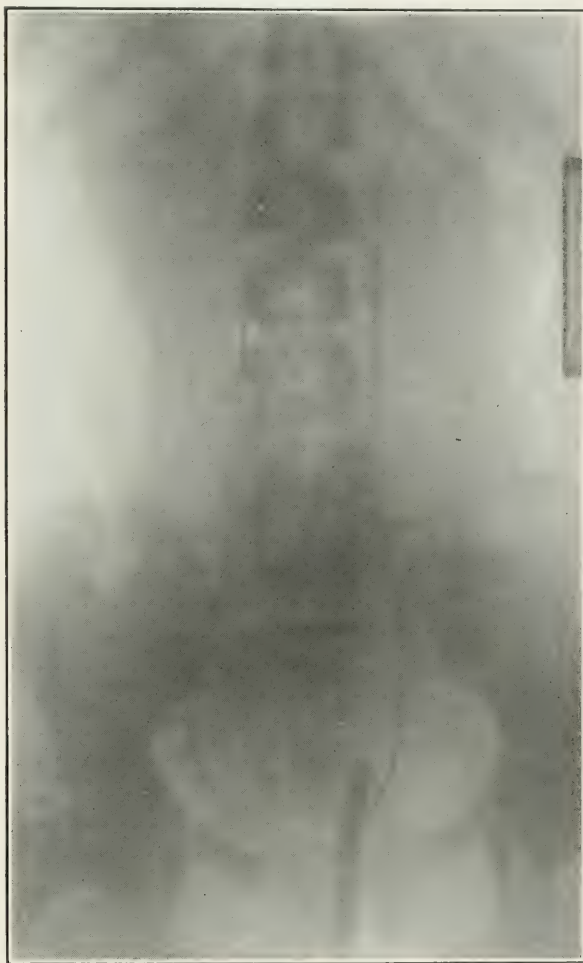


Fig. 1.—Pyelogram. Note the lesser distance of ureteral catheter to the diseased kidney.

*Abdominal:* Tenderness on deep pressure over left lower quadrant. An abnormal tumor was felt in the upper left quadrant. This extended downward to the level of the umbilicus and well toward the median line.

The surface of this tumor was smooth and was closely against the anterior abdominal wall. Its upper border could not be felt because it extended under the ribs. Its lower border was sharply defined and the examining fingers could easily be

pushed under the shelving edge of the mass. The impression was that the surface and edge of the tumor felt, were those of an enlarged spleen. Heart sounds negative with exception of snappy aortic second sound. Blood pressure,—systolic 145, diastolic 90. Lungs and liver negative.

*Laboratory and Pathological:* Cervical smears,—no gonococci. Wassermann,—negative. Blood,—4,480,000 red cells, 7,200 white cells; hemoglobin, 95 per cent; polynuclears, 68 per cent; lymphocytes, 28 per cent; eosinophiles, 4 per cent; morphology (normal); no plasmodia under a 30 minute search.



Fig. 2.—Oxygen distention of the abdomen followed by x-ray photograph. Note the clear outline of the spleen and the underlying kidney, which could not be differentiated by palpation.

*Urine:* Marked trace of albumin; pus in clumps, hyaline casts, masses of epithelial cells.

*Renal Insufficiency:* Blood urea,—40 mg. per 100 c.c. of blood on the 11th and 42 mg. per 100 c.c. of blood four days later.

*Phthalein Test,* intramuscular, 70 per cent for first two hours on the 13th and 66 per cent four days later.

*The Urological Examination* by Dr. Bugbee, was as follows: "Urethra, trigone and sphincter congested. Bas-fond, fundus, and ureteral orifices normal."

*Ureters*: "Catheter in right ureter passes 30 cm. In left passes 25 cm. Urine from the right, flow is free, clear and pale; from the left, not so free, clear and pale. Phthalein intravenously began to show in right ureter at 3 minutes; in the left ureter at  $5\frac{1}{2}$  minutes."

*The Pyelograph*: "X-ray with catheters *in situ* injected with thorium. Right, small kidney pelvis with narrow major calices,—practically normal. Left, broad kidney pelvis with marked separation of middle and lower calices. The major calices are all very broad with ill defined minor calices. The picture may be that of an old infection or a beginning polycystic kidney."

*Phthalein Intravenously*: "Right kidney for first 30 minutes, 20 per cent; left kidney, 15 per cent."

*Chemical and Microscopic*: "Right—pale yellow, clear, acid, slightly bloody. Albumin. Urea 2.8 per cent. *Microscopic*: No casts, isolated and grouped red cells. Occasional isolated leucocytes; no crystals; no bacteria. The blood cells and albumin present are probably due to the trauma of the ureteral catheter. Left.—pale yellow, clear, acid, slightly bloody. Albumin. Urea, 1.6 per cent. *Microscopic*: Occasional small hyaline granular and epithelial casts isolated red cells, occasional isolated and grouped leucocytes; no crystals; occasional bacteria of colon type."

The x-ray picture of the tumor after the abdominal cavity was distended with oxygen, brought out in clear outline the size and location of the kidney tumor with overlying spleen, which had been pushed up by the kidney mass underneath. I append the pyelograph showing the broad irregular left kidney pelvis; also the x-ray of the kidney and spleen in the presence of abdominal oxygen distention.

It is evident from the detailed study of this renal tumor that no definite knowledge could be obtained as to its character. The mobility of the mass precluded the likelihood of an old inflammatory process. The appearance of the pelvis and the major calices was not typical of a cystic kidney.

The kidney function as a whole (both kidneys) was not impaired. In fact, it was increased, ranging between 65 to 70 per cent for the first two hours. This is in line with cases spoken of by Braasch in which the kidney function for five out of eleven cases ranged from 40 to 70 per cent. There was a small variation in the activity of the two kidneys, the right excreting the intravenous phthalein solution in three minutes and showing a 20 per cent excretion in 30 minutes; while the left began to show the solution in  $5\frac{1}{2}$  minutes and gave a 15 per cent excretion in the same time.

An exploratory operation was necessary to differentiate between a possible hypernephroma and a polycystic kidney. The kidney, after being exposed through a free lumbar incision, could be easily palpated. The cortex was thickly studded with numerous underlying cysts of about 2 c.c. capacity. Over the greater curvature many of these had fused into a large cyst of about 40 to 50 c.c. capacity.

The character of the tumor being established any further surgical interference was contraindicated. Rovsing has shown by a report of



cases that such conditions can be frequently benefited by emptying the larger cysts in instances where the other kidney is apparently not involved or at least not grossly effected. Such a procedure must have for its indication the mechanical pressure of the larger cysts, or a persistent hematuria; and should only be undertaken when the combined kidney function is good and the general condition of the patient is satisfactory.

In the case reported the kidney function of the apparently uninvolved right kidney was normal and that of the involved left kidney showed but a slightly less functionating power. There were no pressure symptoms from the size of the cysts neither was hematuria present.

148 WEST SEVENTY-SEVENTH STREET.

# Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-THIRD ANNUAL MEETING, ATLANTIC CITY, SEPTEMBER 20-22, 1920

*(Continued from the April issue.)*

DR. OTTO H. SCHWARZ, of St. Louis, Mo., read a paper on **Submucous Myomata**. (For original article see page 794.)

## DISCUSSION

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—There is just one point to which I desire to call attention. I wonder whether a number of these cases have not been left out of the literature because of differences in classification. I imagine that in some cases the classification adopted has placed this same kind of formation with the fibrous adenomatous cervical polyp, or a myomatous, adenomatous polyp of the cervix.

DR. SCHWARZ.—The point which Dr. Davis makes is very well taken. There is no doubt that many of the smaller tumors are classified as ordinary polyps and, because of the fact that the uterus is not removed subsequently in such instances, the attachment of these polyps cannot be studied. Lockyer in discussing these tumors mentions the fact that he would hardly classify the smaller pedunculated tumors as myomata, but in the larger tumors in which the growth is sessile, as in my case, the term submucous adenomyoma must be applied.

DR. WALTER C. G. KIRCHNER, of St. Louis, Mo., read a paper on **Sigmoidouterine Fistula, with Report of a Case**. (For original article see page 860.)

DR. CHARLES W. MOOTS, of Toledo, Ohio, reported a case of **Lateral Partial Glandular Hermaphroditism**. (For report of case see page 864.)

*(To be continued in the June issue.)*

THE NEW YORK OBSTETRICAL SOCIETY. MEETING OF DECEMBER 14, 1920.

DR. FRANK R. OASTLER, IN THE CHAIR.

DR. HIRAM N. VINEBERG presented a Report of **Two Cases of Ectopic Gestation with Unusual Pathologic Conditions**.

These two cases of tubal molar pregnancy may be worth while presenting on account of their complications.

In the one case there were no symptoms whatever, indicative of the condition and

it offered a surprise at the operation. In the other the symptoms were almost classical but the palpable mass was in the left side and molar pregnancy was found in the right tube.

CASE 1.—Mrs. F. O. consulted me Nov. 23, 1920. She was twenty-six years old, had been married 5 years, had one child four years ago. No miscarriages. The delivery was instrumental and was followed by a severe hemorrhage. Ever since her delivery she complained of pain in both groins and severe backache. The menses appeared in the thirteenth year, was of the 4-week type, 3 days' duration and of moderate amount and attended with severe pain during the first day,

There had been no irregularity, no staining. There had been no recurrence of pregnancy as the husband had been practicing coitus reservatus. She was rather slender, with good color of the mucous membranes of the eyelids and lips.

The thyroid was moderately enlarged and the eyes rather prominent, no other symptoms of hyperthyroidism. The uterus lay in complete retroflexion, the cervix was deeply lacerated in both sides, with thickened and everted lips. In the left fornix a cystic mass the size of an orange was felt. In the right side nothing abnormal was palpated.

The diagnosis was made of retroflexion, with laceration and eversion of the cervix and of a cyst of the left ovary. I advised surgical intervention which was accepted.

While waiting for a room in the hospital where she was admitted 3 days later, she had an attack of severe pain in the right hypochondrium, for which she was given a hypodermic of morphine by the local doctor. I was called and told she was having an attack of biliary colic and to be sure to examine the gall bladder, when I had the abdomen open. On Nov. 20 the operation was performed. After amputating the cervix, an abdominal section was made. The cystic mass in the left side was moderately adherent and on separating the adhesions the cyst broke and discharged a bloody serous fluid. The cyst wall and the tube were removed. Inspecting the right adnexa which lay high up above the brim, I was surprised to find the middle portion of the tube distended to the size of the thumb by a blood clot, the fimbriated end was normal and patulous. There were no blood clots in the pelvis. The tube was removed and on being slit open showed the usual characteristics of molar pregnancy. The ovary was left *in situ*. The gall bladder was palpated and was found apparently normal and free from calculi. The appendix was exposed and removed. The uterus was suspended and the abdomen closed with tier sutures.

The patient made an afebrile recovery and is ready to leave the hospital. I have questioned her again since the operation regarding any irregularity in her menstruation or any staining, or any abdominal cramps other than the attack above related and she replied very definitely in the negative.

CASE 2 presented an almost exact duplication of the local condition in Case 1, the obvious easily palpable mass being in the left side, and the molar pregnancy existing in the right tube, but it differed from Case 1 in that the symptoms were typical of ectopic pregnancy. Mrs. B. K., aged thirty, married ten years, one child 9 years ago, and since then 2 miscarriages. Menses set in at 17 years, 4-week type, duration 5-6 days, not painful. Six weeks prior to admission to Mt. Sinai Hospital she began to stain 3 weeks after her regular period, then she had a profuse flow of blood for 5 days, no loss of blood or staining for 2 days, then a recurrence of the spotting which persisted until her admission to the hospital. During these six weeks she had attacks of cramps at frequent intervals in the lower part of the abdomen, generally more severe in the right side. The intern on duty saw the patient in the admitting room and made the diagnosis of ectopic pregnancy in the right tube. Next morning on rounds, she was examined by myself, my associates, and the intern staff. Every



one felt a mass partly cystic, the size of a turkey egg in the left fornix and nothing was felt in the right side, although I was under the impression that on bimanual examination, the point of my index finger impinged upon a small tender mass high up in the right side. Two of us therefore, diagnosed ectopic pregnancy in the right tube, complicated with diseased left adnexa. The remainder of the staff, 6 in number, felt pretty positive that the ectopic pregnancy was in the left tube, as evidenced by the mass in the left fornix and that the right adnexa were normal. On abdominal section the mass in the left fornix was found to be a cystic ovary, with a thickened tube fairly adherent to the pelvic wall and floor. The right tube lay high up above the brim, was the thickness of the thumb and contained the characteristic blood clot of molar pregnancy. There was a small amount of blood in the pelvis. The right ovary was almost completely destroyed by a corpus luteum cyst and it was with great difficulty that I was able to conserve a small portion of what appeared normal ovarian tissue. The patient is making an uneventful recovery.

#### DISCUSSION

DR. W. P. HEALY.—In discussing the first case that Dr. Vineberg reports I want to ask a question as to the removal of the left tube. I understood him to say he removed the left tube and ovary before the lesion in the right tube was recognized, and that then the right tube was also removed, which meant that this young woman had lost both tubes.

This is not brought up in the way of criticism, but merely to bring out one point, and that is it seems to me that before one removes an appendage from one side, it is worth while to examine the other side so as to have a complete picture in your mind with regard to the possibility of the conservation of a tube or a portion of a tube in a young woman.

DR. LEROY BROWN.—I would like to report in connection with Dr. Vineberg's cases, an unusual condition associated with an ectopic pregnancy in which there was acute recurring hemorrhage from a ruptured tubal pregnancy. The patient recently came under my care at the Woman's Hospital. She gave a history and physical finding recognized by both Dr. Rawls and myself as an extrauterine pregnancy. She had had several attacks of pain, which her physician told me he had quieted with  $\frac{1}{4}$  grain of morphine. She was in the hospital for forty-eight hours without any marked pain. At the close of this period she began to have abdominal pain which rapidly increased in severity and of such a character that it required four doses of  $\frac{1}{6}$  grain of morphine given at half-hour intervals before the pain was even in part relieved. Though the pulse was not affected during this attack, I thought it prudent to operate at once, fearing a large escape of blood. To my surprise, there was not over two drams of fresh blood that was recognized among the intestines. The rest was small blood clots from a tubal abortion. The surprising part to me was that such excessive pain should be attended with such a small escape of blood in the peritoneal cavity.

DR. RALPH WALDO.—If I discuss this, it is to say that it seems to me that where we make our mistake is in the symptoms of extrauterine pregnancy. The pain is not due to the excessive amount of blood or to shock. I have seen cases of profound shock with little blood present. I have seen other cases where the abdomen was full of blood and there was comparatively little pain and little shock. If you operate on these cases during the pain, you will usually find little blood. After the abdomen fills with blood, there usually is little or no pain. In these cases a very important point of differentiating between extrauterine pregnancy and salpingitis, or pyosalpinx is that the temperature is rarely about 100° F., perhaps a little below.

DR. F. R. OASTLER.—Apropos of the remarks made by the last two speakers, I would just like to report a case in which I think both their statements have been refuted.

This patient was in the theatre at 11:00 o'clock and I was called to see her about a quarter to twelve. She gave no history whatever of ectopic with the exception of pain in the right lower side of the abdomen, which was very sharp in character, and on examination she was extremely tender in the right side of the pelvis. She was pretty white and her pulse was increasing in rapidity. She was evidently in shock. I got a history of what the doctor said was an ectopic one year ago, but they didn't operate on her. So I had a history of a possible ectopic gestation a year ago in a woman in pretty profound shock, increasing pulse rate, flat abdomen, excruciating tenderness in the right side of the pelvis and extreme tenderness on pelvic examination. On that I made a diagnosis of ectopic and operated. An hour before going on the table she was still doubled up with pain as though she had colic. I found the abdomen full of blood, which would hardly coincide with Dr. Waldo's statement. I feel the temperature question is a peculiar idiosyncrasy of the patient. The average case runs up not much more than  $100^{\circ}$ , but you must remember that some women who have tonsillitis have a temperature of  $104^{\circ}$  while other women having tonsillitis of the same character will have a temperature of  $101^{\circ}$  or  $101\frac{1}{2}^{\circ}$ . Such women with an ectopic gestation would be apt to run a temperature of  $101\frac{1}{2}^{\circ}$  and, as a matter of fact, in looking over the 157 cases that I reported some time ago I found that a number of them had a temperature of over  $100^{\circ}$ , some of them had  $101\frac{1}{2}^{\circ}$  and  $102^{\circ}$  in some cases. That is not the rule, but it is possible to have a temperature of  $101\frac{1}{2}^{\circ}$  in ectopic, and it is also possible to have acute pain in the abdomen with the latter full of blood.

DR. RALPH WALDO.—I would like, if I may, to say something further. In the first place, if there is any one thing that is characteristic of extrauterine pregnancy, it is that there is no set of symptoms that are common to all the cases. There is another type: If you have an extrauterine rupture in the horn of the uterus and you do not operate immediately, the patient bleeds to death. In these cases there is severe pain. A rupture of any kind in the abdominal cavity is accompanied by excruciating pain at the time of rupture.

DR. HIRAM N. VINEBERG.—The criticism of Dr. Healy is a proper one and is pertinent to the subject. I never remove the adnexa on one side (at least where there is any question of saving anything on that side) without examining the other side. In this instance there was absolutely nothing to save on the left side. The ovary was completely cystic and the tube was firmly adherent and we had to get it out in a ragged state. It was hopelessly diseased and in this case its removal did not make any difference. As a rule I think it is a good thing to emphasize that one should always examine both sides before beginning to operate on one side and to try to save as much ovarian tissue as possible. The tube in these cases does not amount to anything, because if it is found necessary to remove the ovary, the tube is of very little use. On the other hand, all of us have opened up closed tubes in the hope they would remain patent, but judging from the results very few have been successful. I am still doing it in the hope that some of these cases will be successful as two of my cases have been, resulting in subsequent conceptions.

In regard to the temperature, it is very interesting that whenever the subject of ectopic comes up each one is able to give a different opinion. In the beginning of my career in this work I was interested to find, because it created some errors in diagnosis, that of 9 cases which I reported at that time, 5 of them had temperatures running above  $102^{\circ}$  and  $103^{\circ}$ , and one had a temperature of  $104^{\circ}$ . There was

absolutely no other condition to account for the fever. They all also had pretty high blood count.

Temperature, therefore, does not help in the diagnosis of whether the patient has diseased adnexa or ectopic, because in a large percentage of cases there may be a temperature of 102° or 103°.

**DR. O. PAUL HUMPSTONE presented a specimen of Multiple Fibroids of the Uterus Complicating Carcinoma of the Cervix.**

The specimen was removed from Mrs. A. H. at the Methodist Hospital, Brooklyn, a few days ago. It is presented because of the unusual multiplicity of pathology which increased the difficulties of operation.

The history is as follows: Mrs. A. H., age forty years, admitted to Methodist Hospital Dec. 6, 1920. Chief complaint: Bleeding from vagina, with foul smelling, thin brownish discharge. *History:* Married 21 years, 1 child, 1 miscarriage years ago. Weight, best 162, usual 158, present 152. Menstruation always regular, large flux, last period 5 days ago. Last April (8 months ago) began to have bleeding from vagina which appeared only when she strained at stool or exercised more than usual. Her usual leucorrhea became brown in color and very foul smelling. No pain. Menses have recurred regularly. Bled profusely during examination, vagina packed and patient sent into hospital.

*Physical Examination:* Fairly nourished, not particularly anemic looking, gray-haired woman, resting quietly in bed; very foul odor emanating from vagina. Looks much older than forty, at least fifty-five. Heart and lungs normal. *Abdomen:* Relaxed muscular wall. There is a definite lobulated tumor extending up from pelvis, of firm consistency, not tender, hand's breadth above symphysis. *Vaginal:* Very foul smelling, thin, serosanguineous vaginal discharge. A soft friable mass has replaced the cervix, bleeds easily, not involving vaginal wall. Uterus is much enlarged. *Pre-operative Diagnosis:* Carcinoma of cervix uteri.

*Pathologic Report:* The entire specimen weighs 1000 gm. The body of the uterus is spherical and measures 11x11x11 cm. the seat of multiple fibroids. The uterus is sharply constricted at the internal os, below which is an expanded cervix measuring 6 cm. in diameter. The external os is surrounded by a bulky, soft, friable, cauliflower carcinoma. There is a cuff of normal vaginal wall 4 cm. long. The tubes are normal. Ovaries not remarkable. In one broad ligament is a cyst 5 cm. in diameter. *Microscopic examination:* Epithelioma of the cervix uteri, Ewing's "Epidermoid Carcinoma."

#### DISCUSSION

DR. W. P. HEALY.—I just want to say one word about the non-use of radium before operation. Dr. Humpstone said he did not think it would benefit the patient to use it ahead of time as he was going to use it promptly afterwards.

It seems to me that it is well worth while to use it before the operation because during the course of the operation the tissues in both broad ligaments are going to be opened up widely and a good many cancer cells may be scattered and they may not be within reach of the radium after the operation, whereas they are within reach of the radium before the operation. The radium will diminish their efficiency, their activity, if it does not result in the entire disappearance of the cells even after they leave the original site and may be carried elsewhere in the lymphatics. It may destroy the cells entirely before operation. I think it is unwise not to radiate these cases before operation.



DR. HOWARD C. TAYLOR.—By using radium before operation, many cancer cells can be killed and the chance of the implantation metastases undoubtedly is lessened.

I think there is one more thing which might be touched on and that is the question of infection. There is no doubt, no matter how careful one may be in operating on a case of carcinoma of the cervix, that the risk of infection is considerable. Infection is one of the most frequent causes of death following such operations. If radium is used before operation, the cervix diminishes very much in size and the chance of infection after the operation is distinctly less than if radium is not used.

In my judgment there are two things to be gained by the use of radium, one the lessening of the chance of infection and the other the lessening of the chance of implantation of metastases in the immediate vicinity.

The time that it is necessary to wait after the application of radium before operating is still undecided. If the operation is done too soon the tissues will be found to be edematous and there may be an increased risk of infection and of hemorrhage. There may be a lowered healing power in the tissues after the use of radium as there is after a burn and this may predispose to infection. It has been claimed if the operation is delayed too long the normal planes of cleavage are obliterated and the operation made more difficult. I have operated within a week after the use of radium and as late as four weeks and have had no special trouble. My present custom is to operate at the end of two weeks.

DR. H. N. VINEBERG.—I would like to ask Dr. Taylor a question. In a case like this, where the growth is so extensive and so large, would the one application of radium, as I understood him to say, and waiting ten days, have a beneficial effect upon such a large cauliflower growth?

DR. HOWARD C. TAYLOR.—Absolutely, and I think that that cervix would be cut down half in size at the end of two weeks under one application.

DR. O. P. HUMPHSTONE.—The reason the patient was not radiated (I am heartily in accord with Dr. Taylor's statement about radiating first) was that she was bleeding so profusely. Her hemoglobin was low and she had to have a pack in the vagina until she was put on the table. She kept on bleeding in the hospital.

Recently at the Mayo Clinic this subject was discussed while we were there and the time that operation should be done after the primary use of radium was touched upon. Out there they are in accord with operating within a very few days after the use of radium. In a case I saw them operate on, the edema in the tissues was very marked and was even enough to disturb one a little in identifying the ureters. My idea in this case was that if it had been radiated first it would have lessened the operability.

I might say that the patient is convalescing.

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DR. A. C. BECK read a paper entitled **The Advantages of the Two Flap Low Incision Cesarean Section.** (For original article see page 586, March number.)

#### DISCUSSION

DR. A. B. DAVIS.—By this method patients have been saved who would undoubtedly have died by the classical cesarean operation. That was one of the dreadful things about cesarean section in my early experience, when we had to take tremendous chances and our mortality was very high, whereas by this method evidently half the number of children have been saved. I have not used this method of operating. I have probably done 15 or 16 cases of extraperitoneal cesarean section of

the old gastroclytrotomy type. I started in that way a number of years ago and rather purposely kept on in order to try out this method. The operation is certainly very difficult and dangerous. My results, stating them offhand, I cannot give you definitely. I shall publish them later. As I remember it, I have lost one mother and three children. All of them were desperate risks for any operative delivery. I have done all of that type of operating that I intend doing. I am satisfied that the child can be delivered with greater ease and with less risk to the mother, and probably with as good results by an operation such as Dr. Beck mentions.

I believe that passing a fine linen stitch close to the endometrium gives a better apposition and prevents leakage.

As to hemorrhage in any cesarean section: We have arrived at a point where we do not regard that very much. We do not see very much hemorrhage. It is the rarest thing to even tie a vessel in the operation for cesarean section.

It is not my experience that we have extensive adhesions on the uterine wall in repeated cesarean sections. I suppose that I have done probably 200 cases that have been repeated. It is the exception to find extensive adhesions and there are more of them with practically no adhesions on the uterine wall. I think we will find adhesions after most laparotomies of the omentum to the parietal peritoneum under the old scar.

As to the delivery of the baby in these low operations: I have not been able to use forceps successfully in delivering these children. Being rather accustomed to doing versions and also to delivering children by the feet in the ordinary cesarean section, I have done versions, and I find that I am better satisfied with that way of delivering than with forceps or any manipulation that I can get in delivering by the head, because very often in these cases we not only have an infected patient, but we are very apt to have more or less tonic contraction of the uterus, fitting down tightly about the child.

DR. H. B. MATTHEWS.—I am thoroughly in accord with the operation where it is indicated. Some of the operators who are doing this, as Dr. Beck showed, have done it on cases in which it seems to me it was not indicated; that is, on perfectly clean cases in which the classical cesarean section could have been done just as well.

I shall take up just a few advantages and disadvantages.

The flaps are easily made, although in separating the bladder, there may be quite a little hemorrhage.

With respect to hemorrhage from the lower uterine segment: It seems to me that in the cases which I have seen, this has been rather profuse. Theoretically, there must be a line in the lower uterine segment, and I am of the opinion that if one could exactly hit it, one might not have so much hemorrhage; but in the cases in which I have helped Dr. Polak and in the cases I have done myself, including the one that Dr. Beck reported, and in the 11 cases that Dr. Welton did, 7 of which were on my service at the Greenpoint Hospital, the hemorrhage was quite severe. I will say, however, that it gives one no particular trouble for the reason, as Dr. Beck showed, that with the stitch below and the stitch above and with the assistant pulling it up, the hemorrhage is controlled very nicely.

In regard to the delivery of the child: Dr. Davis spoke about something that makes it easier than delivering the head first; namely, by version. That makes it very much easier. I have often wondered, though, if you wouldn't rupture the uterus. In the last case which I did, a couple of weeks ago, and which was reported by Dr. Beck, we had quite a hard time turning the baby, and I am led to believe that there is a possibility that one might rupture the uterus if the woman should happen to be in labor for a long time with a thinned-out lower uterine segment. I think that, as a rule, the easiest way to deliver the baby is by the feet.

With regard to adhesions: It is easy to see why you would have fewer adhesions with the low incision, for the reason that it is well peritonized. I have done 5 operations. Three of those had adhesions, although they were not extensive, and had not given rise to any symptoms. The other two had absolutely no adhesions.

The hemorrhage that is produced in separating the bladder and that which occurs in making the incision, causes hematoma in the lower part of the flap which, in my opinion, accounts for a good deal of the temperature.

In the matter of subsequent deliveries: I shall not say much about that because I have not observed any, but I see no reason why a delivery should not be allowed to go ahead. It is no more, as Dr. Beck said, than an anterior hysterotomy or vaginal cesarean section, and if the wound is sewed up according to the way he said it should be, I see no reason why one could not dilate the cervix and deliver a baby.

In regard to the way in which peritonitis spreads: When you raise these flaps, you give free access to the drainage which breaks through the wound, through the cervix, or the pus may also escape beneath the flaps and go out into the parametrium where there is good lymphatic drainage. In the specimen shown it seems that the peritonitis extended through the lymphatics through the broad ligaments and out that way rather than out into the parametrium and through the lymphatics. Of course, it did not go through the flaps because they were intact, so it must have gone the way I have indicated. In other words, if the patient is frankly infected at the time of operation, this operation would not save her.

As I said before, the exudate under these flaps would be a cause for a longer period of convalescence, and I also think it would account for the higher rise of temperature in these cases than that in the average classical cesarean section. Comparing the temperature in clean cases done by classical cesarean section with clean cases done by this method, there is a higher temperature in cases done by the low incision cesarean section because of the character of the procedure. I might add that I have recently discharged a case done by the classical cesarean section in which the temperature was never above 99° F. In most of the cases which have been done by me according to the method under consideration, the patient's have had temperatures of 101°, 102° and 103°, but it might also be stated that they got well because of the fact that it is an extraperitoneal operation.

DR. G. W. KOSMAK.—I would like to ask Dr. Beck why he considers it necessary to delay the delivery of the placenta until such time as the uterine sutures are introduced. It seems to me that that would complicate the procedure very much. Why does he prefer that to taking out the placenta before inserting the sutures?

DR. W. P. POOL.—I think there need be no hemorrhage in separating the lower flap if ordinary care is taken. There is a number of large veins crossing over the peritoneal surface. In the division of the flap one is very likely to cut through some of these veins and possibly tear others in turning it down. In one case that I did there was a good deal of hemorrhage during the delivery of the child. I did not appreciate it until after the child was delivered.

I think that before incising the uterus, the operator should be careful to secure the veins in this locality. There is not much hemorrhage from the division of the muscle of the uterus in this locality.

DR. O. P. HUMPHSTONE.—I would like to ask Dr. Beck what his fetal statistics are. I think a warning should be given not to use the procedure in placenta praevia.

DR. A. C. BECK (closing).—With regard to hemorrhage, I wish to state that it has never been troublesome in any of my own cases. Several operators, however, have called my attention to its occurrence. If one does not adhere to the midline, hemorrhage undoubtedly may occur.

The specimen which I have shown illustrates the fact that our operation certainly



minimizes the possibility of abdominal adhesions. The large adhesion on its anterior surface was the result of a former high cesarean section.

As one acquires experience from repeated operations, the necessity for the use of forceps in the extraction of the child will seldom be present. No great haste is required for the extraction. As suggested by Dr. Davis, version usually is an unsatisfactory method, as most of the cases were done a number of hours after the membranes had ruptured. In these cases the uterus is moulded tightly about the child, and a rupture is very liable to result, should version be attempted.

In my experience, and that of Dr. Polak, the indications for this operation are the usual cesarean section indications, provided, of course, that the patient's condition is such that the few additional minutes required by our technic will not prove detrimental. Both Dr. Polak and myself are following this technic even in elective cases, because we feel that the fewer adhesions, the smoother convalescence, the stronger uterine scar, are advantages which warrant its use whenever possible.

Dr. Matthews brought up a very interesting point when he mentioned the possibility of increasing the risk of infection through the lymphatics by the dissection of the two peritoneal flaps. Theoretically that is possible. Practically it is not the case, as our statistics show an exceptionally low mortality in cases which were potentially infected.

In reply to Dr. Kosmak I might say that the sutures are introduced before the removal of the placenta, during the interval required for the uterus to contract. It has been my experience that the hemorrhage from the placental site is less if we will wait a few minutes after the extraction of the child before separating and removing the placenta. Of course, the sutures are not tied and my hand is passed between two of them when I separate and remove the placenta.

The fetal mortality when this technic is followed is no greater than that which is obtained in the Sanger operation. If the fetal heart is good at the onset of the operation a living child should be obtained in one hundred per cent of the cases.

It is a question whether this procedure should be followed in cases of placenta previa. In three instances I have encountered the placenta in the lower segment. Two of these were not accompanied by abnormal hemorrhage. In the third the hemorrhage was rather marked, but not alarming. Because of the potential danger in this respect, I personally would hesitate to follow this technic in placenta previa.

## OBSTETRICAL SOCIETY OF PHILADELPHIA. MEETING OF DECEMBER 2, 1920.

THE PRESIDENT, DR. EDWARD A. SCHUMANN, IN THE CHAIR.

DR. J. WHITRIDGE WILLIAMS, of Baltimore, presented a paper entitled **The Problem of Effecting Sterilization in Association With Various Obstetrical Procedures.** (For original article see page 783.)

### DISCUSSION

DR. JOHN G. CLARK.—I am glad to hear Dr. Williams say that he has not taken up the consideration of radiation for the purpose of sterilization. To begin with, radiation in sufficient dosage in young women to cause sterilization would unquestionably cause a premature menopause, which is most undesirable. It would be far better to follow one of the operative procedures which he has suggested. In four instances in which we have used radium for the purpose of stopping excessive hemorrhages, two of whom had myomas, pregnancy has occurred subsequently. In one, a very remarkable case, all of the manifestations of the menopause supervened. After, however, the disappearance of the fibroid the size of an orange, the woman became pregnant and went to term.

I am rather puzzled to find that Dr. Williams goes to the trouble of burying the end of the tube in the broad ligaments, for we have had uniform satisfaction in producing sterilization by detaching a wedge-shaped incision of the isthmal portion of the tube from the uterine cornua. This is a simple procedure, not attended with danger, and is most effective in giving the desired results.

DR. RICHARD C. NORRIS.—Dr. Williams, it seems, favors hysterectomy as a means of sterilization. I think one of the vital questions is to decide, whether the uterus is of real value to the woman. Is she, in the future, better off if she is sterilized by one of the methods which does not remove the uterus, or is she just as well off if the uterus has been removed? There is in recent years an increasing belief that the uterus should be conserved and that there is something in the organ itself valuable to the woman. Personally I believe that we should leave the uterus, and that we can be just as successful in sterilizing the woman in our cesarean section cases, unless there is infection. If the question is simply one of sterilization my attitude from my present knowledge would be to save the uterus and resort to cornual excision. I recently saw a case of grave heart disease in which I thought it justifiable to terminate pregnancy. The same question is always presented in such cases as Dr. Williams has mentioned, "If it is right to terminate pregnancy, in these grave cases is it right to sterilize?" I believe that, if for serious chronic ailments we are going to terminate pregnancy, it is justifiable to sterilize the patient. I believe that in these gravely ill women with bad heart and kidneys in early pregnancy a vaginal operation is safer for the women. Unfortunately we must wait, after inducing abortion, until involution has sufficiently reduced the size of the uterus to permit of cornual excision through an incision of the anterior vaginal wall. In the matter of sterilization at the time of cesarean section I say to the woman who has had two cesarean sections with two children, "Why not consider the advisability of not having any more?" Usually our patients follow our advice in such matters. Regarding Dr. Hirst's technic, it seems to me that its essential feature is successful closure of the uterine cornua. Uniting the cornual ends of the tubes can have no effect upon the entrance of an ovum into the uterus. If either cornu becomes patulous, some influence would bring the ovum and a spermatozoon together and, united, they could enter the uterus. I deliberately cut out the cornu of the uterus and sew the cut muscle together. Until the radium experts settle the question whether radium sterilizes ovarian function and thus omits menstruation or brings about that result by varying degrees of burns of the endometrium, I shall continue to use surgical means of securing sterilization.

DR. CHARLES P. NOBLE.—We all must feel that Dr. Williams shows the greatest conservatism in his presentation, and surely, if there should be a change in the future it would be toward a greater rather than a less use of sterilization. The special point raised by Dr. Norris with reference to the welfare of the woman depending upon whether she has hysterectomy or the tubal resection operation done, interests me. In my judgment women with sound constitutions do not suffer from hysterectomy in the sense of postclimacteric neuroses. It is women having defective constitutions that develop postclimacteric neuroses and psychoses. I would ask Dr. Williams whether in the various indications for sterilization the personal constitutional status of the patient and her supposed capacity to bear children desirable to the state, were used as a basis for decision. In other words, did the eugenic point of view enter into consideration as to the desirability of sterilization?

DR. GEORGE M. BOYD.—In my early sterilization operations, I did a section of the tube at a short distance from the uterine cornu. I had a failure, and since then I have done an operation similar to the one just described by Dr. Williams, making a V-shaped incision at the cornu of the uterus. Pregnancy has not followed this operation. I have recommended sterilization in cesarean section in cases where the

mother has two healthy children and she wished the operation. With the uncertainty of success in whatever tubal operation is performed, hysterectomy in certain selected cases will always fill a field of usefulness, particularly in women approaching the menopause.

DR. STRICKER COLES.—In my experience with toxemia, eclampsia, and Bright's disease, only in a very small number of cases has there been any indication for sterilization. Some cases of toxemia when it was necessary to interrupt pregnancy have subsequently borne children. One case having very severe case of eclampsia later had two children without trouble and this woman is still living 20 years after the eclampsia. In acute Bright's disease in pregnancy I have never seen a case in which sterilization was justified.

DR. LIDA STEWART COGILL.—I agree with Dr. Norris that probably the uterus had better be saved unless some reason arises counterindicating this. I have one case in mind of cesarean section followed by sterilization. The patient had asked that she be sterilized. The child has proved rather delicate and the mother is anxious for a second child, and has asked me if it is possible to have the tubes restored that she might become pregnant. I would ask Dr. Williams whether he has met such a condition in which the patulous character of the tubes was asked to be restored.

DR. DANIEL LONGAKER.—The plan followed in my early cases was double ligation and excision of the tube. In one operation done about twenty years ago there has been no recurrence of pregnancy. In our later operations we followed the plan of excising the tube at its uterine end, burying the end under the broad ligament and suturing the cornua. There have been no recurrences.

DR. THEODORE A. ERCK.—I would like to ask Dr. Williams whether he has met cases in which a temporary sterilization seemed advisable. I have in mind a fine young woman in good health without kidney disease who has given birth to one child. In two succeeding pregnancies she suffered from grave toxemia, requiring abortion. She is again pregnant, and in spite of careful attention, is again toxic. It seemed to me that in her case a temporary sterilization for several years might be tried, as she is extremely anxious to have more than one child.

DR. GEORGE ERETY SHOEMAKER.—Excision of the cornua seems to be highly important if sterilization is to be effective. It is rather peculiar, what a strong effort Nature makes to preserve the patency of any uninjured portion of the tube. If we leave a small channel through the uterine muscle it is sure to remain open. The other day in excising the tube by the wedge-shaped method I was interested to see a couple of millimeters of the lining of the tube extruding, illustrating how easy it would be in removing a tube to have some of the actual lining remain.

DR. WILLIAMS (closing).—I make it a rule never to sterilize a patient at the first cesarean section unless it is indicated by the existence of serious disease. At the second section if the woman insists upon it, I sterilize her, but generally speaking I do not advise the delivery of more than three live babies by cesarean section. When sterilizing the latter type of women I would rather take the uterus out. In recent years I have thought that perhaps I was too radical and consequently I have resorted more and more to the tubal operation. I have not had Dr. Norris' experience with the broad ligament, as we can extraperitonize the stump in practically all of these cases.

Replying to Dr. Noble, I have not sterilized from the eugenic point of view. As soon as we begin to do so, we are sure to get into serious difficulties concerning indications; it is impossible to face many of the factors concerned with an open and unprejudiced mind, so that we would tend to become "uplifters" instead of rational medical men.



# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Collective Review

### The Views of Primitive Peoples Concerning Conception and the Puerperium

BY JONATHAN WRIGHT, M.D., PLEASANTVILLE, N. Y.

Much stranger to us than the mistaken ideas primitive man deduced from the phenomenon of menstruation,\* seems the fact, realized late in sociological studies, that primitive man did not at first know that the conception of the child in the womb is dependent on sexual intercourse, but from this has arisen in almost every religion tales of miraculous conception due to other sources. Frazer has pointed out that it was owing to this ignorance of the physical intervention of paternity that the primitive mother explained to herself the quickening of the child in her womb as due to the entrance of a child-spirit from some external object—a tree or fruit, a beast or bird. It is intimated that from this arose the social complexities of the totem. Into this vexed question fortunately it is not our function to enter. With more regret, because of much absorbing and obvious interest in the subject, we are precluded from entering upon many of the other divagations of thought which have flowed from this primeval ignorance, imputed even to the first pair in the Garden of Eden. Owing to the promiscuity of the sexual relation in many primitive tribes, most pronounced on the average in those lowest in culture, we are free to argue that the very naturalness and freedom with which this was practiced prevented the human animal at first from realizing the connection between the sexual act and the process of gestation. This may readily be understood when it is realized that there are many tribes in which children cohabit regularly with one another, often long before puberty in either sex. Most accounts testify to the injury to the health from the practice. The testimony to these facts is so overwhelming that nothing but a lack of taste is likely to induce any one, not especially concerned with the subject to dilate on it.<sup>10</sup> Mr. Frazer<sup>11</sup> summarizes Australian theories as to the causes of conception thus: “Curiously enough they do recognize it as the cause of conception in all animals, and pride themselves on their superiority to the brutes in that they are not indebted for the continuance of their species to such low and vulgar means. The true causes of conception in a woman, according to them, are four in number. First, she may have received a particular species of black bream from a man whom the European in his ignorance would call the father; this she may have roasted and sat over the fire inhaling the savory smell of the roast fish. This is quite sufficient to get her with child. Or secondly, she may have gone out on purpose to catch

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\*See Review of Literature on Menstruation in this Journal, January, 1921.

a certain kind of bull-frog, and if she succeeds in capturing it, that again is a full and satisfactory explanation of her pregnancy. Thirdly, some man may have told her to conceive a child, and the mere command produces the desired effect. Or, fourth and lastly, she may have simply dreamed that the child was put into her, and the dream necessarily works its own fulfilment. Whatever white men may think about the matter, these are the real causes why babies are born among the blacks on the Tully River." The Rev. Mr. Roscoe<sup>12</sup> says of the Baganda: "While the present generation know the cause of pregnancy, the people in the earlier times were uncertain as to its real cause, and thought that it was possible to conceive without any intercourse with the male sex. Hence their precautions when passing places where either a suicide had been burnt, or a child born feet first had been buried. Women were careful to throw grass or sticks on such a spot, for by so doing they thought that they could prevent the ghost of the dead from entering into them, and being reborn. Women, who were found to be with child in circumstances in which they ought not to be with child, might deny any wrongdoing on their own part; they might affirm that some flower falling from a plantain upon them while they were digging, had caused them to become pregnant. If the reader considers what a close connection was thought to exist between the plantains and the ghosts of the afterbirth, and also how the ghosts of ancestors were thought to reside amongst the plantains, he will readily understand that the conception was supposed to have taken place by the reincarnation of one of the ghosts." This comes very close to the Christian version of the Immaculate Conception, though the author does not make that remark, but instead: "The woman who pleaded she had become pregnant by the falling of a plantain flower upon her back, was apparently not punished, as was the case with a woman who had committed adultery." Frazer,<sup>13</sup> who gives his own turn of phrase to this, literally cited from Roscoe, remarks: "What more natural than that a ghost should lurk in each flower and dropping adroitly in the likeness of a blossom on a woman's back, effect a lodgment in her womb?"

Though I doubtless am quoting from some of the sources from which Mr. Frazer, in the above, has derived some of his own information, I note that Spencer and Gillen<sup>14</sup> describing the tribes of Northern Central Australia say: "To cause a child to enter a woman a Kaitish man will take a Churinga (Churinga is a bull roarer) and carry it to a spot at which there is a special stone called 'kwerka-punga' (child-stone), which he rubs with the Churinga, at the same time asking the kurinah, or spirit of the child, to go straight into the woman. In the Arunta we have just the same belief in these stones inhabited by children who can by magic be made to go into any woman, but in this tribe the Churinga is not used as it is by the Kaitish people."

As to the ceremonies of circumcision and especially subincision, "the ceremonies can never have had any reference directly to procreation, for the simple reason that the natives, one and all in these tribes, believe that the child is the direct result of the entrance into the mother of an ancestral spirit individual. They have no idea of procreation as being directly associated with sexual intercourse, and firmly believe that children can be born without this taking place. There are, for

example, in the Arunta country certain stones which are supposed to be charged with spirit children who can, by magic, be made to enter the bodies of women, or will do so of their own accord. Again, in the Warramunga tribe, the women are very careful not to strike the trunks of certain trees with an axe, because the blow might cause spirit children to emanate from them and enter their bodies. They imagine that the spirit is very minute,—about the size of a small grain of sand,—and that it enters the woman through the navel and grows within her into the child.” According to Frazer, it was especially prominent in the belief as to the soul. At first a supernatural being was supposed to supply the Australian woman with babies made out of mud, introducing them into her body. Then it was the soul or spirit which was thus introduced. Naturally they supposed this was procured from the body of some corpse, especially of a child. A woman stepping over the body or the representative of the body or its soul was supposed to be impregnated with the soul of the dead child. It seems quite plain that in all this we are justified in supposing that there existed the germs of the belief in the resurrection, metempsychosis, the future life, etc., etc. “Amongst the Arunta, Luritcha, and Ilpirra tribes, and probably also amongst others such as the Warramunga, the idea is firmly held that the child is not the direct result of intercourse, that it may come without this, which merely, as it were, prepares the mother for the reception and birth also of an already-formed spirit child who inhabits one of the local totem centers. Time after time we have questioned them on this point, and always received the reply that the child was not the direct result of intercourse.”<sup>15</sup> Neuhauss<sup>16</sup> says that in New Guinea “one may not think it possible, yet it is a fact that some women in all seriousness deny there is any relation of sexual intercourse to the supervention of pregnancy. They are, however, in the minority, though animistic beliefs tend to render others uncertain as to it. \* \* \* These imagine the part the man plays is of only secondary importance. The child is really formed in the mother’s body and is released from its attachment by the act of coitus.”

How primitive man came by the correct idea finally is not very clear from the reports, though it may be inferred. It may also be easily understood how it came that he soon associated the idea of animal procreation with the fertilization of plants. Into all of this Frazer goes very elaborately, but from it we must refrain.

One of the most remarkable of customs, based upon, it is difficult to say just what, is the “couvade,” deriving its French name from the old Comté of Béarn, where, as in many other fairly civilized regions it is said still to linger. Manifestly this remarkable custom must have originated at a stage of culture subsequent to the period in which primitive man became aware of the part played by man in fecundating the female. Instead of nursing care being given to the parturient woman, her husband receives not only the attention of nursing after the birth of a child, but is subjected to regulation of his diet and his actions before the birth of the child. Roth<sup>17</sup> says: “To the so-called civilized portion of humanity the custom appears exceptionally barbarous in its treatment of the suffering wife, and at the same time it seems extremely absurd. So absurd does it seem to us that every one on first reading about it smiles incredulously as though some traveller’s



tale were being recited. But the effect on the woman is nothing like what we imagine it to be, for among savages we find almost everywhere that women are delivered with little pain or trouble." He cites the custom as existing or having existed in Europe, Asia, Africa and America. So numerous are the localities, times and tribes mentioned that I refrain from transcribing them, but refer the reader to his article. The reasons given, while not so numerous, cannot all be here mentioned either. "The reasons assigned for practising the custom are as varied as the custom itself, and the explanations offered by travellers who have met with it, as well as by those who have studied it, are widely divergent. Marco Polo was informed that the origin of the custom in Zardandan was due to the fact that the women having had a hard time of it, it was only fair that the man should have his share of the suffering. In the Antilles, Du Tertre states, the father was debarred from a variety of animals as food lest by his partaking of them the child should afterwards display as vices the peculiar weaknesses of these animals. This interpretation agrees very thoroughly with that found to exist in Guiana by Messrs. Brett and Im Thurn. Spix and Martius say that among the Mundurucus the custom arose from the idea these people entertained that the child is solely the father's, the mother's share in the bearing and bringing forth being likened unto that of the earth, which in plant life simply receives the seed.\* This is the view Southey found recorded, thus: 'It was their opinion that the child proceeded wholly from the father, receiving nutrition indeed and birth from the mother, but nothing more, from which Dr. Ploss argues the custom may have arisen out of a desire on the part of the community to make the father answerable by his conduct for the welfare of the child.' " And it is bound up usually with customs and taboos into which also we cannot fully go, but some idea may be given of them. Skeat<sup>18</sup> says of the Malay couple, when conception has become evident: "The wife, meanwhile, has to be \* \* \* circumspect. She bridles her woman's tongue resolutely, and no word in disparagement of man or beast passes her lips during all these months, for she has no desire to see the qualities she dislikes reproduced in the child." But it was not only the mother who had to be careful, but the father: "Before the child is born the father has to be more than usually circumspect with regard to what he does, as any untoward act on his part would assuredly have a prejudicial effect on the child, and cause a birthmark or even actual deformity, any such affection being called *kenan*. In a case which came to my notice the son was born with only a thumb, forefinger, and little finger on the left hand, and a great toe on the left foot, the rest of the fingers and toes on the left side being wanting. This, I was told, was due to the fact that the *father* violated this taboo by going to the fishing-stakes one day and killing a crab by chopping at it with a cutlass \* \* \*"

The "couvade exists among the Aztecs northwest of the city of Colima; at the birth of a child the husband goes to bed instead of the wife and mother."<sup>19</sup> Aranzadi<sup>20</sup> says it still exists in Northern Spain in a modified form, where Strabo noted the custom among the ancient Celtiberri. Ripley,<sup>21</sup> however, casts doubt on its present practice there.

We find this idea predominant in the origins of Greek medicine and widely prevalent in the medicine of later times.

He says that among the Basques "this statement has never been substantiated in modern times; although the observance, found sporadically all over the earth, probably did at one time exist in parts of Europe. Diodorus Siculus asserted that it was practiced in Corsica at the beginning of the Christian era. There is no likelier spot for it to have survived than in the Pyrennees, but it must be confessed that no direct proof of its existence can be found today, guide books to the contrary notwithstanding." However that may be it is found today among many, though by no means among all, primitive men in other regions of the globe. According to Simson:<sup>22</sup> "It is rife among the Jivaros in the wilds of Ecuador, and at the birth of a child, the mother has to undergo all her parturient troubles outside the house, exposed to the elements, whilst the husband quietly reclines in the house, coddling and dieting himself for some days, until he has recovered from the shock produced upon his system by the increased weight of his responsibilities as a father. This custom is still also in some measure extant in many of the civilized villages on the Solimoes, where, amongst the Tapuyos, and even degrees more approached to white, the father, on the birth of a son or daughter, lays himself in the hammock, from which he will not move on any consideration, to do any kind of work, nor especially to touch any cutting instrument, fearing thereby to exercise evil influences upon the healthy development of the child." According to Ratzel,<sup>23</sup> Dobrizhoffer, who was an early missionary in this region, reported it, saying the husband lies "up a whole month and eats only cassava bread or little fishes taken by means of the nicou-plant. Any breach of the rules may result in the child's dying or growing up vicious. Even the whites in some so-called civilized places on the Amazon believe that the child will not thrive if the father does not remain some days inactive in the hammock."

Tylor<sup>24</sup> relates at length instances of the couvade performances and comments as follows: "We have laid open to us in these accounts a notably distinct view, among the lower races, of a mental state hard to trace among those high in the grade of civilization. The couvade implicitly denies that physical separation of 'individuals,' which a civilized man would probably set down as a first principle, common by nature to all mankind, till experience of the psychology of the savage showed him that he was mistaking education for intuition. It shows us a number of distinct and distant tribes deliberately holding the opinion that the connexion between father and child is not only, as we think, a mere relation of parentage, affection, duty, but that their very bodies are joined by a physical bond, so that what is done to the one acts directly upon the other. The couvade is not the only result of the opinion which thus repudiates the physical severance that seems to come so natural to us: and this opinion again belongs, like Sorcery and Divination, to the mental state in which man does not separate the subjective mental connexion from the objective physical connexion, the connexion which is inside his mind from the connexion which is outside it, in the same way in which most educated men of the higher races make this separation. Not only is it held that the actions of the father, and the food that he eats, influence his child both before and after its birth, but that the actions and food of survivors affect

the spirits of the dead on their journey to their home in the after life."

We may trace some connection of these ideas with theories enun-  
ciated from philosophers of credit in our own civilization. "Lastly,  
we may leave it in the hands of Swedenborg, who declares that the  
soul, which is spiritual and is the real man, is from the father, while  
the body, which is natural and as it were the clothing of the soul,  
is from the mother. Here, he tells us, we may see the reason why the  
mind and disposition of the father is communicated to the children  
for generations, which seems a somewhat lopsided argument \* \* \*.  
Like other magical fancies, the *couvade* seems to belong to certain  
low stages of the reasoning process in the human mind, and may for  
all we know have sprung up at different times and places."

We have had occasion to dwell repeatedly upon the essence of this  
clear exposition of Tylor, who with so much genius has blazed a path  
to the mind of primitive man. To the savage—to Swedenborg and his  
spiritually minded followers—the differentiation between spirit and  
matter is not clearly drawn. With it are bound up the homeopathic  
and the telepathic ideas,—and it all is the quintessence of the "occult"  
to us, but it must be realized to understand the evolution of human  
thought. At the same time we may perhaps conjecture that this idea  
often rose spontaneously in the mind of man when he first became aware  
that the child was the result of his participation in the sexual act. A  
new observation not infrequently leads to exaggerated inferences de-  
duced from it. Tylor's argument would apply equally to the mother.

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(To be continued.)

## Selected Abstracts

### Extrauterine Pregnancy

**Wiegand:** *Statistics on Extrauterine Pregnancy*. *Monatsschrift für  
Geburtshilfe und Gynackologie*, 1920, lii, 316.

An analysis of 210 operated cases shows the following facts: Most  
of the cases were seen in patients between thirty and thirty-five years  
old. Three-fourths of the total number were women who had no, one



or two children, the actually highest number being 66 for women who had been delivered once, as against 43 nulliparæ. In the case of the parous women the one observation was almost constant, that considerable time had elapsed since the last confinement, the average of the total being five and one-quarter years.

These observations support the general assumption that in the etiology of ectopic pregnancy acquired functional anomalies of the tubes play the most important rôle. Since the tubal affections very often are bilateral, it is not surprising that 10 women of this series later passed through another operation for extrauterine pregnancy lodged in the other tube. Pathologic findings during operation in many instances furnished further proof for the inflammatory origin of the tubal alterations responsible for the anomalous insertion of the ovum. Four of the cases in this series were instances of ovarian pregnancy. There was no case of far advanced ectopic gestation among them. Eight patients died, a mortality of 3.8 per cent, six of them clearly as the result of excessive blood loss. Of the 2 others one succumbed to sepsis, the other to tetanus 5 days after the operation.

H. EHRENFEST.

**Stein: A Clinical Study of Ectopic Pregnancy; A New Etiological Theory.** Medical Record, 1920, xcvii, 478.

Stein reports a study of 43 cases (7 per cent) of ectopic pregnancies out of a total of 580 gynecologic operations in the service of Dr. Haynes at Harlem Hospital. He did not find a long period of sterility as an antecedent to an ectopic pregnancy. Most cases occur in women under forty years of age. The etiology is obscure. The other tube showed evidence of inflammatory involvement in about one-fourth of the cases. Infection plays a minor rôle from the etiologic standpoint. Stein believes that the normal meeting place of the ovum and spermatozoon is in the uterus and that the following factors may account for the meeting place in the tube: (1) late ovulation in regard to insemination; (2) hypermotility of the spermatozoon; (3) lodgement of ovum in a recess or congenital ampulla of the tube; (4) mild salpingitis. Twenty-four of the 43 cases were correctly diagnosed. The author concludes that every patient who has missed her regular periods should be examined for and suspected of ectopic pregnancy. The proper diagnosis can be made in most cases, in some it would be obviously illogical, and in others apparently impossible. Operative intervention should be undertaken as soon as the diagnosis is verified whether the tube is ruptured or not.

C. O. MALAND.

**Magid: The Relation of Ectopic Pregnancy to Chronic Endocervicitis.** Medical Record, 1921, xcix, 435.

The author summarizes his article as follows: Fertilization of the ovum occurs normally in the tubal lumen. Tubal nidation of the fertilized ovum results from an arrest of the fertilized ovum in its normal progress toward the uterine cavity. The only essential factor productive of such an arrest or impediment to the normal transit of the fertilized ovum is the presence of tubal diverticula or sacculations. They may be congenital or acquired. The congenital variety is ex-

tremely rare, while the acquired form is extremely common. The most prolific and constant cause of the acquired form, hitherto obscure in its etiology and course, stands revealed by Sturmdorf's investigations, as an insidious perisalpingitis, invariably resulting from chronic endocervicitis. Chronic endocervicitis, with its resultant perisalpingitis, thus stands in the direct relation of cause and effect in the production of tubal gestation, and it follows as a logical deduction, that the eradication of chronic endocervicitis presents a prophylactic measure in tubal pregnancy.

C. O. MALAND.

**Hirsch: Concerning the Etiology and Diagnosis of Extrauterine Pregnancy.** *Zentralblatt für Gynaekologie*, 1920, xliv, 1062.

The author reports an unusual case in which the reflection of the peritoneum was abnormal on the anterior and left border of the uterus, resulting in a definite band in the region of the uterovesical fold, which definitely kinked the tube near its attachment to the uterus and caused the arrest of the impregnated ovum.

The author refers to the possibilities of diagnosis of extrauterine pregnancy, noting the value of rest, ice bag, and opium. When, in spite of the exhibition of this treatment, with normal temperature, the tumor remains unchanged and attacks of pain recur, and in spite of the attacks of pain the tumor decreases in sensitiveness, the diagnosis is usually extrauterine pregnancy.

The second measure is the intramuscular injection of ergot or possibly pituitrin, which under ordinary circumstances will cause cessation of bleeding, but which is without effect in the case of extrauterine pregnancy; and third the frequent association of cysts of the ovary with extrauterine pregnancy. It is noted that Opitz found cysts seven times in 18 cases and that Fraenkel reckons their frequency at one in every three or four extrauterine pregnancies. No reason is given for their occurrence.

H. M. LITTLE.

**Norris: Icterus in Ectopic Gestation.** *Surgery, Gynecology and Obstetrics*, 1920, xxxi, 34.

Icterus is an occasional symptom of ectopic gestation and may be the symptom which determines the differential diagnosis. In its absence, the gross and spectroscopic examination of the blood serum may show considerable quantities of blood pigments.

Free blood in the peritoneal cavity, in the presence of a strong lytic substance or serum rich in protease, may be split with the production of hemotoidin which, again, is absorbed and appears in the blood stream.

Three cases are cited. In two, icterus was pronounced and disappeared promptly after operation. In a third case there was no icterus but the blood serum had a dark golden-brown color and both serum and urine gave a positive Gmelin reaction.

R. E. WOBUS.

**Proust: The Culdesac Sign of Ruptured Tubal Pregnancy.** *Paris Medical*, 1920, x, 113.

Accumulation of extravasated blood in the posterior culdesac represents one of the most valuable clinical findings for the diagnosis of

a ruptured ectopic pregnancy. But also in the absence of this accumulation of blood deep pressure against the posterior fornix in cases of ruptured tubes causes a severe and typical pain, which will make the patient cry out even if she is half unconscious from the blood loss. This tenderness is explained by Proust as due to a peritoneal irritation by the congestion present even if the hemorrhage is slight. In his hands this palpatory sign has proved of great practical value in the diagnosis of tubal pregnancy.

H. EHRENFEST.

**Schiffmann: Spontaneous Cure of Young Tubal Pregnancies.** Arch. für Gynaekologie, 1920, cxiii, 133.

The most common, almost regular, outcome of a tubal pregnancy is tubal abortion or tubal rupture. Urgent symptoms call for surgical interference. In the absence of alarming symptoms the ovum may be extruded gradually under formation of a hematocele. Slow resorption of the latter finally may result in a spontaneous cure. In other instances the ovum after transformation into a mole is finally destroyed by resorption. Various authors have expressed divergent opinions concerning this type of spontaneous cure, but A. Martin was thoroughly convinced of the possibility of such an occurrence if the ovum was very young. Careful microscopic study of a specimen, removed by the writer during operation, led to the definite conclusion that the ovum had implanted itself in the interstitial portion of the tube, apparently as the result of a salpingitis interstitialis. Rupture, however, did not lead to hemorrhage but to a peritonitis. Streptococci were found in the peritoneal cavity and in the tubal lumen. Examination of the other tube showed in its interstitial portion a histological picture which permits of the definite deduction that also this interstitial tube once sheltered an ovum. A hemorrhage caused a hyaline degeneration and only partial resorption and organization of placental villi.

Partial resorption of an ovum implanted in a tube was also strongly suggested by another specimen obtained during operation for suspected left tubal pregnancy. The tube contained a broad based, mushroom like, dark red growth, the size of a cherry stone. Microscopic examination revealed remnants of degenerated placental tissue, a typical picture of mole formation.

His own studies and careful consideration of all similar observations recorded in literature lead Schiffmann to the conclusion that resorption and organization of a young ovum, implanted in the tube, represents not a common but a typical form of spontaneous cure. A small ovum thus may disappear completely without having caused any noticeable subjective or clinical symptoms.

H. EHRENFEST.

**Borell: Bilateral Extrauterine Pregnancy with Spontaneous Degeneration on One Side.** Zentralblatt für Gynaekologie, 1921, xlv, 142.

The author adds another to the 26 cases already known of bilateral tubal pregnancy.

Patient 26 years of age. History of peritonitis at nine years of age. No pregnancies, but three miscarriages, without history of fever. Last period December 14, 1917; lasted a single day. In February, 1918,



slight nausea. Patient believed herself pregnant. On March 18 slight bleeding. On March 19 sudden severe pain in lower abdomen; fainting; cold sweat. Admitted with diagnosis of internal hemorrhage.

Operation for extrauterine pregnancy, with rupture. On opening peritoneum, moderate quantity of dark red fluid blood; some clots. In left tube, near the isthmus, a small tumor, the size of a hazel nut, and evidence of some perforation. Ovary on this side showed no abnormality. On examination of the right tube it was found that at the isthmus there was a similar swelling with a definite depression on the surface, but no perforation. The right ovary showed a few small cysts and a fresh corpus luteum. Both tubes were removed for examination. The patient made an uninterrupted recovery, and the interest in the case lies particularly in the microscopic finding of the pregnancy in the right tube, which showed definite evidence of endarteritis and some calcification of the villi. There had been a certain amount of bleeding into the lumen of the tube, and this also had undergone organization, showing the possibility of the disappearance of an early extrauterine pregnancy without tubal perforation or tubal rupture.

H. M. LITTLE.

**Walther: A Case of Full-term Extrauterine Pregnancy.** *Medizinische Klinik*, 1920, xvi, 799.

The patient, a 36 year old, primigravida, had always been healthy. No history or evidence of gonorrhea. The last menstrual period began April 8, 1919 and fetal movements were perceived during the first part of September. Early in December the movements became gradually less noticeable and ceased completely about the middle of the month. The patient thought she was gaining in weight and constantly felt fatigued and exhausted. Late in December she was examined by a midwife who thought the size of the uterus did not correspond to the menstrual history and was unable to hear the fetal heart.

Shortly after the estimated date of confinement—the latter part of January—the midwife again made an examination but was unable to detect anything significant except that the shape of the abdomen had materially changed. Walther first examined the patient at this time. The child was in the second breech position and filled out the right side of the abdomen. No fetal heart sounds were heard and the fetus was only very slightly movable. On vaginal examination the breech was palpable as through a thick pad and the cervix did not feel as it should in a primipara practically at term—there was no obliteration of the canal and no dilatation of the os. The uterus could not be distinguished from the fetal mass.

The patient left the hospital against advice but at the suggestion of the midwife returned early in March for further observation. During the interval between the two admissions there had been mild abdominal pains, nausea and difficult urination but no history of the passing of any decidual tissue or of bleeding.

Examination gave practically the same findings as before except that on rectal palpation the uterus seemed to be only slightly enlarged and pushed backward and to the left. A sound was passed and the uterine cavity found to be empty. There was slight bleeding at this

time. Diagnosis of full-term extrauterine pregnancy with dead child presenting by the breech was made and operation advised.

Operation was done nine weeks after the expected date of confinement. Upon opening the abdomen the parietal peritoneum was found everywhere adherent to the intestines and there was a small amount of free fluid. The adhesions were freed by the use of gauze sponges. The fetus enclosed in a pseudo-membrane lay in the right side of the peritoneal cavity with the sac adherent on all sides. By the careful use of sponges the sac was freed without bleeding and was lifted from the cavity the cord having been cut near the placenta. The fetus was extremely flexed and presented by the breech. An unusually thick placenta was adherent in the culdesac. It was rolled on itself and the separation was completed easily and bloodlessly. The retroverted uterus was lifted up and finally sutured to the anterior abdominal wall. The right adnexa were incorporated in the pseudomembranous sac and were probably removed with it. Although the left tube is given as the seat of the pregnancy no reference is made concerning its condition or disposition.

The pregnancy had developed in the left tube, had aborted at an unknown age and become a secondary abdominal pregnancy. The fetus which had died at the beginning of the ninth month weighed 4 pounds and the placenta 650 grams. Convalescence was smooth and the patient was discharged on the sixteenth day.

Walther quotes previous authors to show the relative rarity of this condition and to prove a diminished mortality where the placenta can be completely removed. He says that the mortality under the conditions obtaining in his case should be only 5 per cent as against 33 per cent if operation is undertaken earlier and the placenta cannot be completely removed. The prognosis seems to be better if the child is dead because of the decreased size of the placental vessels. He recommends a reasonable delay if the child is dead and emphasizes the need for releasing adhesions by blunt dissection rather than by cutting.

E. D. PLASS.

**Sullivan: Intraabdominal Pregnancy.** Journal American Medical Association, 1921, lxxvi, 521.

Sullivan briefly reports a case of full-term extrauterine pregnancy. The placenta was adherent to the uterus, right tube, ovary and broad ligament. The child weighed eight pounds, cried lustily for a while, but died after an hour. The mother recovered.

R. E. WOBUS.

**Maury: Abdominal Pregnancy, Fetus Living at Time of Operation.** Surgery, Gynecology and Obstetrics, 1920, xxxi, 523.

Maury reviews 29 cases of this sort in which the fetus was alive at time of operation, without coming to any very definite conclusions. He calls attention to the greater difficulty of removing the still functioning placenta, the question whether it is to be removed at all, to be decided in each case. He feels that those cases which are recognized before 7½ months, should be operated on at once in the interest of the mother, while after that time, the operation should be deferred until after the death of the fetus, since, under these conditions the maternal

mortality is from 10 to 40 per cent, while about one-half of the babies die within a few days, a part of the remainder being more or less deformed.

R. E. WOBUS.

**Liebe: True Ovarian Pregnancy.** *Monatsschrift für Geburtshilfe und Gynaekologie*, 1921, liv, 102.

Laparotomy was performed on a woman of forty-two, iv para, 12 years after her last confinement, on the diagnosis of cystic enlargement of left ovary. There was no menstrual anomaly, the discomfort being limited to abdominal pain, tenesmus of bladder, constipation alternating with inability to control anal sphincter. Left ovary, size of hen's egg, was removed. On opening, was found to contain an intact ovular sac about 3 cm. in diameter, with a perfectly preserved embryo of 3 mm. in length. Microscopically the presence of small follicles in a portion of the ovular sac was ascertained. The case represents a true primary ovarian pregnancy, established in the cavity of a follicle. Up to 1913 a total of 52 cases of this sort had been recorded in literature, with further records collected by Liebe, the total number at present has reached 84.

H. EHRENFEST.

**Hanak: A Case of Ileus Combined with a Second Tubal Pregnancy in the Same Tube.** *Wiener Klinische Wochenschrift*, 1920, xxxiii, 1010.

Patient was seen May 12, 1919, thirty-one years old, married.

Past History: Passed through a normal labor in 1905. In October 1915 only the sac but not the tube itself of a right tubal pregnancy was removed and the pelvis drained through the abdominal wound. Convalescence was complicated by a fistula of the small intestine which closed within two days. Patient left the hospital in March, 1916, with wound healed and free of symptoms.

Present History: Catamenia were normal up to three months ago, amenorrhoea since. For two days has not passed feces or gas, has vomited, and has had attacks of pain in the pelvis, the last one being very severe. Abdomen is distended; there is a hernia in the scar of the former incision, blue in color; no signs of pregnancy.

Operation revealed fluid and coagulated blood free in the abdomen, a tubal pregnancy on the right, retroflexion of the uterus, thickening of, and adhesions about, the left tube and ovary. A piece of small intestine was adherent to the left adnexa, so as to be completely obstructed by kinking, and more small intestine was adherent to the right adnexa, though not completely obstructed. The right tube and ovary were removed, the adhesions causing the obstruction cut, and the wound closed in layers. Normal convalescence.

Examination of the specimen showed a corpus luteum in the ovary, and a 9 cm. long fetus in the dilated ampulla of the tube.

The original cause of the adhesions was the previous salpingitis and they were made worse by the long drainage after the first operation. The ileus was brought on by the intestinal paralysis caused by the aborting of the tubal pregnancy. The tubal pregnancies were due to the chronic salpingitis as that is thought to be the commonest cause.

In a superficial review of the literature the author found no other report of the combination of ileus and extrauterine pregnancy. Lud-



wig reported ninety-six cases of pregnancy complicated by ileus but in only four cases was the ileus due to the pregnant uterus alone, the others being due to adhesions or other malpositions of the intestine. Fñth also believes that the pregnant uterus alone rarely causes ileus.

Two ectopic pregnancies on the same side is a rare occurrence. Runge writes that it is rare. Martin in "Diseases of the Fallopian Tubes" cited only two cases. Bracht reported a case similar to the author's in which a pregnancy in the ampulla of a tube, of which the uterine end had been removed at a previous operation for tubal pregnancy, was operated on. Benzel reported a similar case, occurring in the uterine end of a tube left at a previous operation for tubal pregnancy, and collected three other cases from the literature.

FRANK A. PEMBERTON.

**Douglas: Ruptured Ectopic Pregnancy in Uterine Cornu.** Journal American Medical Association, 1920, lxxiv, 582.

The left tube and ovary were removed from a woman of 30 for ruptured ectopic in 1916, the tube being tied close to the uterus. Twenty-seven months later she again had symptoms of ruptured ectopic pregnancy. At operation, a corpus luteum was found in the right ovary, the right tube being normal. On the left cornu of the uterus was found a ragged, raw bleeding area. The pelvis contained considerable fresh blood. The ovum was not found. R. E. WOBUS.

**Palmer: An Unusual History of Ectopic Pregnancies.** Journal American Medical Association, 1921, lxxvi, 793.

The case here recorded is that of a woman who had a retroversion, but no history of pelvic inflammation. In 1901 the right ovary and tube were removed for ruptured tubal pregnancy. Later she gave birth to six children, one being stillborn. In 1914 the left tube was removed for ruptured ectopic pregnancy, the tube being simply tied with catgut ligature as the patient was in extremis. In 1920 the patient again gave birth to an 8½ pound living child. R. E. WOBUS.

**Schroeder and Rau: Unusual Combination of Multiple Myomata, Bilateral Tubercular Salpingitis with Extrauterine Pregnancy, and Evidence of External Migration of the Ovum.** Zentralblatt für Gynäkologie, 1920, xlv, 972.

An unusual case, reported as the second in the literature, where the above combination was known to be present. Woman, forty-one years old, married eleven years. Not previously pregnant. Three years previously had been curetted for endometritis. No history of tuberculosis. Menstruation regular, four to five days. Last menstruation end of January. Towards end of March crampy pain with frequent urination, and since beginning of April some bloody discharge.

Examination: No colostrum. Nothing abnormal in vulva or vagina, but cervix pushed up and to the right, showing two small polypi protruding. Body of uterus anteverted and turned somewhat to the left. Behind it and on both sides nodular tumors, which prevent accurate palpation of appendages.

Diagnosis: Myomata uteri. Pregnancy (?).

Laparotomy April 6: Moderate quantity of free blood. Uterus distorted by numerous large-sized myomata; soft on palpation. Right appendages normal in size and in usual position. Tube slightly thickened but open and without adhesion. Right ovary normal containing corpus luteum. On the left side adhesions. Tube moderately thickened. Fimbriated end edematous and swollen. Near left end, between mesosalpinx and bladder, adherent to intestine, a tumor, size of an orange, containing placental tissue and a fetus 4 cm. long. The tumor was removed, followed by complete hysterectomy.

The main features of the pathological examination were: (1) Marked decidual reaction of the endometrium; (2) Presence of corpus luteum in the right ovary; and (3) The implantation of the fertilized ovum to the serous external surface of left tube.

The combination of tuberculosis and extrauterine pregnancy is unusual, inasmuch as the tubercular infection of the tube undoubtedly makes impregnation more difficult, but in this particular case the infection of the tube seems more recent than the pregnancy, and appears to have occurred by the blood stream. The relatively long distance travelled by the ovum after fertilization would account for the facility with which it became attached to the serous surface rather than the mucosa, and this attachment renders the external wandering more likely than an internal wandering across through both tubes.

H. M. LITTLE.

**Joscelyne: A Case of Extrauterine Fetation Presenting in the Vagina.**

British Medical Journal, October 2, 1920, No. 3118, p. 516.

In July, 1918, the writer attended a woman who appeared to be suffering from a miscarriage. The patient, a multipara, thought she was six months pregnant; she complained of almost continuous pain, and had a red vaginal discharge. The head of the fetus could be felt through a thin bag of membrane. The uterus was only slightly, if at all, enlarged, lying to the left of the presenting mass, and distinctly separable from it. He perforated the membrane (which was the thin vaginal wall) with the finger, and delivered the fetus, which appeared to be of about five months' development, and which had evidently been dead some time. The placenta was removed with some little difficulty, leaving a large ragged hole in the right vaginal fornix. There was a little hemorrhage, and the patient made a good recovery. Joscelyne believes this to have been a case of extrauterine fetation which developed and came down between the layers of the broad ligament.

F. L. ADAIR.

**Wolff: Ruptured Hematoma of the Ovary, Hematocele and Coincident Tubal Hemorrhage on the Opposite Side.** Zentralblatt für Gynaekologie, 1921, xlv, 151.

Patient thirty-seven years old, v para. Last pregnancy nine years ago. Last menstruation March, 1920. Patient seen June 12, 1920, giving following history:

Since the beginning of May moderate bleeding—unusual dark blood; no membrane; no clots. Pain in lower abdomen, right and left, with occasional fainting attacks and for past few days some crampy pains both sides, similar to labor pains.

Examination shows uterus in midline; not markedly increased, but soft. Behind uterus is a large mass, very tender, not movable; owing to sensitiveness definite palpation of appendages not possible. Patient very anemic. Diagnosis: hematocele, resulting from extrauterine pregnancy. Patient was under observation for two days, then on account of the increase in abdominal resistance, operation was done.

Tumor was found to be a large hematocele, definitely arising from the right appendages, a large hematoma of the right ovary, which had ruptured into Douglas's culdesac. The right tube was lengthened but otherwise unaltered. The hematoma was removed, leaving behind a portion of the ovary, which appeared normal. Inspection showed the left tube to be thickened in its entire course, particularly in the ampulla. From its lumen blood could be expressed. The left tube was removed on the suspicion of a tubal abortion. Microscopic examination, however, failed to reveal any evidence of pregnancy in the tube. Many suggestions have been made as to the cause of such ovarian hemorrhages, notably masturbation and coitus interruptus with consequent pelvic congestion. The age limit is usually thirty to forty-nine years.

H. M. LITTLE.

**Meyer: Hydatiform Degeneration in Tubal Pregnancy.** Surgery, Gynecology and Obstetrics, 1919, xxviii, 293.

While macroscopic hydatiform mole in tubal pregnancy is exceedingly rare, (only seven authentic cases having been reported) Meyer found hydatiform degeneration of the villi in 48 out of 1187 specimens of tubal pregnancy in the Mall collection. The ages of these pregnancies were approximately from 6 to 218 days, most of them being empty chorionic vesicles or remnants of such, though some specimens contained fetuses in various stages of preservation. These findings coincide with the great frequency of hydatiform degeneration found in uterine abortions, which fact was emphasized by Gierse as early as 1847.

R. E. WOBUS.

**Maxwell: Calcified Tubal Mole.** Surgery, Gynecology and Obstetrics, 1920, xxxi, 388.

An exploration was done on a negress aged 55 who had passed the climacteric four years previously. The ampulla of the atrophic left tube contained a calcified mass  $3 \times 3 \times 2\frac{1}{2}$  c.m. The interior of the calcified shell contained a semi-translucent jelly, the wall showed remains of chorionic villi and decidual reaction.

R. E. WOBUS.



## Announcement

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The July issue of the Journal will be No. 1 of Volume II. The first volume will end with the June issue, which will include a complete authors' and general index of the nine numbers in this volume. In the future there will be two volumes a year. We feel that our subscribers will be better pleased with a smaller volume, because it can be bound and handled to better advantage. The change is being made at this time in order to have the volumes run with the calendar year, January and July. This change will not affect the subscription price of the Journal. It will remain \$6.00 a year; i. e., twelve issues from date of subscription.

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## Item

Dr. J. Clifton Edgar has resigned as Professor of Obstetrics at the Cornell Medical School, which Chair he has held since the organization of the College in 1898. The Departments of Obstetrics and Gynecology will now be combined under the Directorship of Dr. George Gray Ward, Jr., who will be in charge of the combined Departments, as Professor of Obstetrics and Gynecology, with Dr. Harold C. Bailey as Associate Professor of Obstetrics.

---

## ERRATA

In the abstract of Dr. S. Di Palma's article, page 745 of the April issue of the Journal, the second line from the bottom should read: "cornu had a small rupture superiorly which was roughly circular and about .5 cm. in", etc.

Page 746, line 8, should read: "lumen. Microscopic section of the enlarged *uterine* portion of the tube shows a", etc.

## Book Notices

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Acknowledgment is made of the receipt of the following books, selected reviews of which will appear in early numbers.

OPERATIVE GYNECOLOGY. By H. S. Crossen. Second Revised Edition. St. Louis: The C. V. Mosby Company. \$10.00 net.

GYNECOLOGY FOR STUDENTS AND PRACTITIONERS. By Thomas Watts Eden and Cuthbert Lockyear. Second Edition. New York: The Macmillan Company, 1920.

THE DIFFICULTIES AND EMERGENCIES OF OBSTETRICS PRACTICE. By Comyns Berkeley and Victor Bonney. Third Edition. Philadelphia: P. Blakiston's Son & Company, 1921.

THE ENDOCRINES. By Samuel Wyllis Bandler. Philadelphia and London: W. B. Saunders Company, 1920. \$7.00 net.

A HANDBOOK OF MIDWIFERY. By Comyns Berkeley. Fifth Edition. New York: Paul B. Hoeber, 1921. \$2.25 net.

MATERNITAS. By Charles E. Paddock. Third Edition. Chicago: The Year Book Publishers. \$1.50 net.

A TEXT BOOK OF GYNECOLOGICAL SURGERY. By Comyns Berkeley and Victor Bonney. Second Edition. New York: Paul B. Hoeber, 1920. \$11.00 net.

GYNECOLOGIC AND OBSTETRIC MONOGRAPHS. New York: D. Appleton & Company, 1921. (5 volumes issued.) 1. Pelvic Inflammations in Women. By John Osborn Polak. 2. Menstruation and Its Disorders. By Emil Novak. 3. Gynecological and Obstetrical Tuberculosis. By Charles C. Norris. 4. Extra Uterine Pregnancy. By Edward A. Schumann. 5. Cesarean Section. By Franklin S. Newell.

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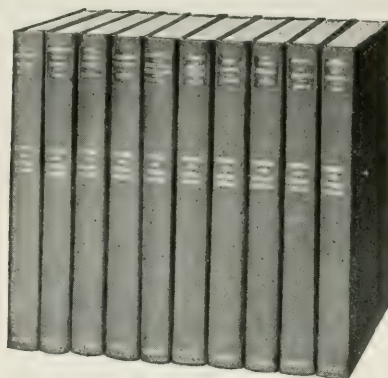
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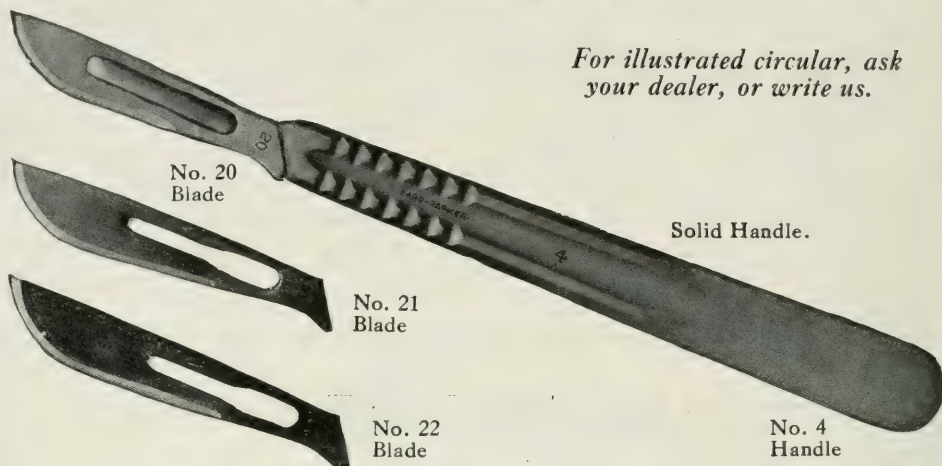
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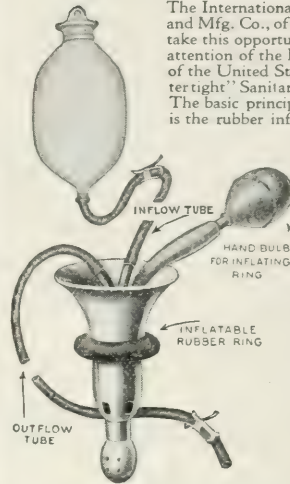
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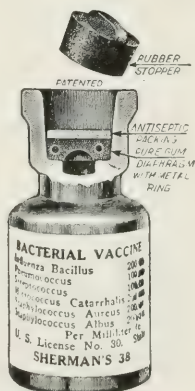
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## Original Communications

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### ADENOMYOMETRITIS, NOT ADENOMYOMA OF THE UTERUS

By L. W. STRONG, M.D., NEW YORK, N. Y.

THE object of this paper is not a mere consideration of what terminology is most appropriate for a well recognized pathologic condition, but rather a review of evidence for the purpose of determining whether we are justified in regarding the overwhelming majority of these conditions as neoplasms, rather than metritic hyperplasias.

It appears to be a universal custom to designate all macroscopically visible gland and muscle new growths as adenomyomata, whether present in diffuse thickening of the uterine wall or in localized globular form. The term adenomyometritis when rarely used, is reserved for the appearances revealed by the microscope. Plainly the term adenomyoma denotes a neoplasm and it is of very practical moment to know when, if ever, that designation is justified, since neoplasms are capable of unlimited growth, while hyperplasia may regress if the exciting cause is removed. Furthermore an entirely different biological conception lies between the two terms, and this applies to adenomyomata occurring in other situations, such as the umbilicus and round ligament.

These tumors are very common in the uterus, and are seen either as circumscribed, myomatous growths containing glands, or as diffuse thickenings of the myometrium in which the mucosa is recognized in the form of circular depressions which are moist and soft.

There are other related conditions which must be considered but of which the histogenesis is more obvious and which consequently are not likely to be referred to as adenomyomata. Of these, irregular penetration of the uterine glands from the basalis into the myometrium is

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NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

the commonest and the most important, since it has a direct bearing on the causation of the so-called adenomyomata. This is seen to a greater or less degree in all uteri, and is extensive in proportion to the amount of inflammatory hyperplastic, or sometimes atrophic, change that is present in the endometrium or myometrium. If the glands of any "adenomyoma" have a direct connection with the uterine mucosa, as in fact they often do, as seen in serial sections, then their origin from the mucosa is always at least possible.

Secondly, there are the frank myomata in which occur uterine glands. These, according to McCarty, amount to 6.4 per cent of all myomata, and the glandular structures owe their origin either to inclusion of mucosa from growth of the myoma or to penetration of submucous or even subserous myomata by glands growing in the manner we have just described. The epithelial content of true myomata may thus be secondary in character, but it must proliferate in itself, or else the tumor is not an adenomyoma any more than a myoma is a fibromyoma. In many cases it is impossible to prove that both parts do so proliferate.

Finally these structures may assume polypoid forms, either as myomata containing glands or as tube corner adenomyomata. These latter are very seldom true tumors and very often they regenerate, just as does adenomyositis in senile uteri.

The question directly concerns only the discrete globular forms and the diffuse thickenings of the uterine wall, for these are the ones which are universally termed adenomyomata. Of these two the diffuse form is by far the commoner, and this diffuseness of growth is so characteristic that there can be no question of enucleation, even in the forms which are more or less sharply localized in one area only. This in itself speaks against a neoplasm. These diffuse tumors may grow to a considerable size and may be found in the cervix as well as the corpus.

It was von Recklinghausen who first ascribed to them a mesonephric origin, and although this theory has been abandoned by most writers, nevertheless, the implication that they are neoplasms still remains. There appear to be two main reasons for this persistence, which are first the impossibility of establishing any absolute criterion between hyperplasia and neoplasia, and second the lack of any definite evidence of any other (inflammatory) etiology.

There are then two lines of evidence to examine, first the proofs of the neoplastic origin and second the possibilities of other origin. Practically we have already shown that there are several ways in which these appearances may occur where there is no question of a mixed tumor. These are the myomata with included or penetrated glands, and the extremely common penetration of glands under inflammatory stimuli with an associated hyperplasia of muscle tissue. In view of these proc-



esses the burden of proof would seem to be heavily against any assumption of neoplasia.

As to the neoplastic hypothesis, the mere size of some of these tumors, together with their known power of invasive growth outside of the tissue or organ from which they originated, are suggestive and apparently the reasons for the assumption.

There is no criterion in histology which will differentiate hyperplasia from neoplasia in its inception. Both represent reactions of the tissue to underlying stimuli, and the reaction is the same in both cases as far as histology is concerned. The criterion which is taken as definitive of neoplasia is destructive growth, but even that is to a certain degree unreliable, for granulation tissue of inflammation may be in excess of the needs of repair, and may be to an extent destructive of normal tissue. In the penetration of glandular tissue seen in the healing of fistulas there is a condition analogous to the infiltrative growth of so-called adenomyomata.

We must now consider the various theories of the neoplastic origin of these growths.

I. Müllerian. It is assumed by some that the epithelial structures of these tumors are embryonal rests of misplaced müllerian ducts. That such misplacements do occur has been shown by Meyer, but that these have any special tendency to neoplastic or other growth, is an assumption without facts to justify. Nor would this origin of the epithelium, even if correct, justify the belief that the tumor resulting from it was necessarily neoplastic, because the same causes which led to inflammatory hyperplasia of normally located glands would cause hyperplasia of ectopic epithelium nonneoplastic. Finally the assumption is entirely inferential and cannot be demonstrated to be true in any case. So even if the epithelial parts of these tumors are (inferentially) derived from heterotopic epithelium, the tumors themselves may be inflammatory hyperplastic.

The most significant objection to a müllerian origin is that it does not account for the muscular part of the tumor. It would have to be shown that portions of the mesenchyme were misplaced, together with the epithelium, and there are no data to support this assumption.

II. Adenomyomata from wolffian rests. There have been a few cysts of the uterus which may be referred to such an origin. As to the so-called adenomyomata, the assumption of a wolffian origin can be only inferential from the situation, since their structure does not differ from that of structures known to be of inflammatory origin (adenomyometritis).

If a tumor can be shown to grow not only in its glandular, but also in its myomatous part, solely from dislocated mesonephral rests such an origin would be not impossible. Up to this time R. Meyer has found just one positive case, which is entirely different in structure from the

pictures of ordinary adenomyomata, in that it consists of coiled canals and glomeruli.

Since the epithelium of the internal genitalia and the surface epithelium of the ovary in proliferation produce pictures identical with epio-phoron tubules and to the uterine mucosa, it is plain that morphology is no criterion for origin.

It is a common finding in adenomyosalpingitis (salpingitis isthmica nodosa) to have appearances of glands and cysts, but generally without a cytogen stroma. The lack of stroma is to be expected in the tube, which normally has little. The fact that all these structures resemble each other is due to the restraining, compressing influence of the musculature upon the epithelium. It is well recognized that in the endometrium the form and arrangement of the glands is due to the relative growth of the stroma. If the stroma is slow growing, the glands will be serrated. If the stroma is dense the glands are simple in form. So all these so-called adenomyomata resemble each other and resemble uterine mucosa only because that form is as simple and undifferentiated as possible. It will be found that the form of the glands depends upon the tissue spaces into which the glands grow, and which they dilate, and varies with the presence or absence of cytogen stroma. If the stroma is abundant the glands are wider. No conclusions can be drawn either from the presence or absence of this cytogen stroma, because that is formed from the connective tissue lying between the muscle bundles, and may be formed even without the presence of glands (Meyer).

In discussing the histogenesis of the connective tissue and myomatous parts of so-called adenomyomata, we may say that the majority are similar to simple metritis and myomata in that they are metritic-hyperplastic products. The usually spindle-celled connective tissue, which frequently accompanies a part of the epithelium, serves as a stroma. It is not essential that it should arise from a preformed stroma, but a good part arises from the intermuscular, especially perivascular, connective tissue. That is seen to be the case in many of these uterine growths, where the very small, regular gland lumina have no stroma at all; but when the glands have proliferated to some degree, stroma is formed around them. The dislocation of embryonal musculature is not demonstrated. The assumption that dislocated epithelium irritates uterine musculature as a foreign body is untenable.

The presence of a cytogen stroma in such tumors as umbilical or inguinal, would argue against rather than for a müllerian origin, because the stroma of the uterus is mesenchymal and grows in around the müllerian ducts; secondarily, when a connection with the umbilicus or inguinal canal would be impossible.

After numerous researches on metritic or adenomatous uteri, as well as on inflamed tubes, R. Meyer (Veit's Handbuch) states that inflammation makes the beginning in all cases. The opening of the interstices

in the muscle and the penetration of the glands is a form of fistulous healing. The ingrowth of epithelium of the skin in granulation tissue as described by Friedländer is absolutely similar. A hyperplasia of muscular tissue may accompany this. This origin also holds for those tumors which develop from the peritoneum and it would also hold for dislocated müllerian rests if such could be proved.

In conclusion we would allude to adenomyomata of the umbilicus and round ligament as well as other extrauterine sites. It may be stated that there are no embryologic data which would justify an assumption that they were derived from müllerian ducts. This assumption has been made first, from histologic similarity, second, from their occurrence only in women, and third, from the fact that they may swell or bleed at the menstrual period. The histologic appearance has already been shown to be no criterion. The swelling and bleeding is not conclusive, since vicarious menstruation may occur in any mucosa, and hemorrhage in these cystic glands is to be expected.

As to the occurrence in the female alone, it must be remarked that the reported number of these cases is very small (eleven or twelve for umbilicus). A müllerian origin would not exclude possible occurrence in the male, since at the very early date (before second month) when the structures which are going to form the umbilicus (allantois, omphalomesenteric duct) are in close enough relation to the müllerian ducts to allow of a possible inclusion, they, the müllerian ducts, are still present in the male.

That such tumors of the umbilicus might be derived from rests of the urachus of omphalomesenteric duct is undeniable. To refer adenomyomata of the umbilicus to misplaced uterine tissue, leaves out of account the muscular part of the tumor. This cannot be uterine musculature for that grows in from a mesenchymal anlage at a relatively late stage and only in the lower part of the urogenital cord, where a relationship to the umbilicus is out of the question. This shows also that the cytogenic stroma sometimes present in the umbilical tumors, cannot be uterine in origin.

Similarly tumors at the distal end of the round ligament have been referred to misplaced uterine mucosa and to misplaced mesenteric epithelium. Embryologically, the round ligament represents the inguinal fold of the mesenchyme which runs from the urogenital fold to the crista inguinalis. Only the inner end comes into relationship with the müllerian ducts or the wolffian duct and it is only at the tube corner that an adenomyoma of the round ligament could have such an origin. This question has often been discussed without a satisfactory explanation. It is merely intended here to indicate that a wolffian origin is not indicated embryologically.



## HYPEREMESIS GRAVIDARUM\*

BY EDWARD SPEIDEL, M.D., LOUISVILLE, KY.

EVERY case of vomiting of pregnancy should be considered with the utmost seriousness. Women are so accustomed to associate nausea and vomiting with a first pregnancy, that the occurrence is made a matter of jest by the associates and friends of the afflicted, and in consequence, only when the condition becomes almost unbearable does a woman present herself for treatment. That the pregnancy itself is the main disturbing factor in the case is evident from the fact that the condition dates from the onset of pregnancy, continues for a definite period during that pregnancy and in extreme cases is checked suddenly with the interruption of the pregnancy. That other conditions may be associated with it and in consequence aggravate the condition, primarily due to the pregnancy, must also be accepted. Every pregnant woman is more or less neurotic, which applies especially to the woman pregnant for the first time. Neurotic symptoms are given in all of the text books as evidences of pregnancy. In a first experience it is natural that the primipara with the fanciful tales that have been told her by her friends, should look upon this new experience with a mixture of fear, dread, and pleasurable anticipation. Her mind is centered upon the organs involved and the sexual element is supplied. She craves more and more the affections of her husband and reflexes between the sexual organs and the digestive system are easily established. Consequently it is wise to consider all cases of hyperemesis as at least toxic and neurotic. A reflex factor in the shape of a displaced uterus or eroded cervix can quickly be eliminated in the early treatment of the case by proper measures of correction. In the means of determining the degree or the seriousness of the toxemia existing in a given case, we are apparently still as much at sea as ever. The contention by Williams, that the ammonia-nitrogen coefficient will serve as an indicator of the kind and degree of hyperemesis does not seem to hold good in all instances. The test is one that is not readily made and as an acidosis is found in most pregnant women, and as inanition itself causes an acidosis, it is difficult to decide whether the urinary condition is due to the toxemia or to the lack of food.

The test may be supposed to be more reliable if Williams' suggestion is followed by the use of copious rectal enemata of sodium bicarbonate solution. If acidosis persists in spite of such treatment, then it may be claimed to be due to the toxemia. The gravity of the condition may then

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\*Thesis submitted for admission to the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, 1920.

perhaps be determined by the rise or fall of the ammonia-nitrogen coefficient, if a laboratory for the accurate performance of the test is accessible.

Whether or not Hirst's claim that the nausea and vomiting is due to nonabsorption of corpus luteum during pregnancy is correct is still a mooted question, but as the newer therapy depends upon this hypothesis it should receive consideration. Hirst claims that women are constantly absorbing corpus luteum, as one is developed with each menstrual period. During pregnancy this ceases and the corpus luteum of the last menstrual period increases in size until about the end of the third month, and as it is during this period of nonabsorption of corpus luteum that we have the nausea and vomiting of pregnancy, he claims that this points clearly to a distinct relation between the two.

It seems to the writer that the fallacy in this deduction is in the fact that nausea and vomiting should be associated with every pregnancy as nonabsorption of corpus luteum in accordance with that idea occurs in all.

Investigations by Litzenberg seem to indicate that there is more or less disturbance of liver function in even ordinary pregnancies, as shown by the presence of urobilinogen or urobilin in the urine of such pregnant women, consequently the presence of any of these substances in the urine will not aid us in determining the gravity of a given case of toxemia.

Elevation of temperature with increase in the frequency of the pulse, although indicative of a serious turn in a given case, may be absent in some very serious cases and in consequence cannot be depended upon as reliable symptoms.

When jaundice shows itself, especially icterus of the conjunctiva, such grave liver destruction is already present that interruption of pregnancy may hardly save the patient. With the knowledge that there are no definite tests by which the gravity of a given case can be determined, it has become the custom of the writer to resort at once to extreme measures in the treatment of all such cases.

Absolute isolation of the patient in a well ventilated room and in charge of a competent nurse is the first essential. Banishment of the husband and anxious relatives is such an extremely important factor in the treatment of such patients, that a physician should unhesitatingly retire from any case in which such a request would not be rigidly observed. The writer has seen a number of cases in which the condition improved at once upon the establishment of such an order. Fresh air and sunshine are other accessories that, of course, aid materially in the improvement of the patient to such an extent that in proper surroundings placing the patient in a tent out of doors may be resorted to. In addition, then, absolute rectal feeding is depended upon, not even allowing water by mouth, and in following the suggestion in an article on feeding in hyperemesis by Bacon, a solution on the order of the one mentioned

by him has been used in my cases. It consists of glucose, 50; beef peptonoids, 100; calcium chloride, 0.3; sodium bicarbonate, 3; sodium chloride, 4; and distilled water, 1000.

A beef peptonoid is selected that contains vitamins in place of the 50 parts alcohol as found in the original formulæ, as 100 parts of such peptonoid may be supposed to contain about 50 parts of alcohol.

The calcium chloride is added in order to supply that much needed element, some authors ascribing a great deal of the toxemia of pregnancy to a calcium deficiency.

In addition to this preparation, a solution of sodium bromide, 40 gr., and chloral, 20 gr. to the one-half ounce of water is added to each 1000 c.c. of the above solution.

The bromide and chloral are increased or diminished according to the demands of the individual, the object being to keep the patient in a somnolent state the greater part of the time. At times the bromide-chloral mixture may be omitted from the proctoclysis given during the day and only added to that administered at night.

A rectal irrigation with sodium bicarbonate solution should be given in the early morning and then after that is expelled the proctoclysis of the feeding solution should be begun at the rate of about 60 drops a minute. With the addition of the bromide and chloral the patient will rarely complain of inability to retain the solution, or of rectal irritation. The patients are generally very well satisfied during the days that they are entirely dependent upon this solution for water and nourishment and there is little difficulty in carrying them along in this manner for at least a week. Ever since Hirst advocated the use of extract of corpus luteum in this condition it has been deemed advisable to inject one or two ampoules of the solution intramuscularly each day. It has been used in a number of cases that ended in recovery and it has been used just as faithfully in others in which interruption of pregnancy had to be resorted to, consequently the writer has not been able to form a definite opinion as to its value. Under no circumstances would it be considered wise to depend upon it without the extreme dietary and other restrictions outlined in this paper.

After a week of this regime it should be possible to begin the administration of food and water by the mouth. Gastric lavage with sodium bicarbonate solution had better precede the resumption of oral feeding and then contrary to the usual advice thoroughly cooked cereals, zwieback and toast are better foods to begin with than the generally advocated milk foods. Rectal feeding should be continued intermittently in conjunction with the tentative oral feeding, until the cessation of vomiting and the ability to take food naturally indicate that the condition is safely under control.

If the extreme measures advocated are unsuccessful, then from the experience gained from a number of distressing fatal cases of this kind,



the writer would unhesitatingly interrupt the pregnancy in order to save the life of the mother if possible. A number of cases of late interference with the pathetic death of the young mother has been enough to impress the danger of too late interference, upon the mind of the writer. Interruption of the pregnancy in all instances should be done in two stages if necessary. The insertion of a soft rubber catheter and gauze into the uterus as a preliminary, and then if necessary the emptying of the uterus the next day under nitrous oxide anesthesia with the gloved finger.

One precaution should be taken in the conduct of these cases. It should be generally understood by the profession that the Catholic church does not admit of the interruption of a pregnancy in a member of that faith or in a Catholic institution unless the child is viable. There is absolutely no exception to this rule. Consequently when conducting a case of this kind the patient should either be sent to an institution of a different denomination or if interruption of the pregnancy becomes necessary in such a patient who happens to be in a Catholic hospital then it is futile to argue with the management of that Hospital, and the obstetrician has no recourse except to remove his patient to another hospital that is not subject to such restrictions.

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## SECONDARY OPERATIONS: AN ANALYSIS OF ONE HUNDRED GYNECOLOGICAL CASES\*

BY EDWARD LEE DORSETT, M.D., ST. LOUIS, MO.

THE question confronting men doing abdominal surgery, and especially gynecology, is whether or not the patient will be free from all her past symptoms, or whether there will be a recurrence or a continuation of her old trouble. This question, I think, applies much more to gynecology than any other department of surgery. The time is past when we can say: the patient has recovered from an operation; the important point is whether she will be free from those symptoms for which she was operated.

We are all too well familiar with those women whom we, or some other surgeon, have operated upon, presenting themselves with the same or a new set of symptoms following an operation upon some of the pelvic organs. When this has occurred a number of times, we begin to think that an error has been committed somewhere; perhaps a mistake in technique or diagnosis; the selection of the improper operation, or the wrong time in the progress of the disease; or, perhaps, a too radical or a too conservative operation.

A certain percentage of our gynecologic cases do not receive the proper preoperative treatment, nor the proper postoperative treatment after they leave the hospital. To this neglect are due some of the poor results which lead to a second operation. Of course there are a small number of cases in which poor results are obtained, due to causes over which we have no control, and for which we can hardly hold ourselves responsible.

It was after reading a most excellent paper by Dr. John O. Polak that it occurred to me to report these cases, but I have followed a somewhat different classification and with more minute detail. So many of these cases are interwoven with a complication of conditions that, in some instances, it is next to impossible to definitely separate them into distinct classes. There are, however, a number of definite conditions that stand out very markedly in each case, and these I have endeavored to tabulate under their respective heads.

In the one hundred cases here reported, twenty-two were operated upon, primarily, by the writer, the remainder by other operators. Eight women had three laparotomies, and two had four sections. In six cases that underwent three operations only two of them were laparotomies; and of two cases only one of the operations was an abdominal section.

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\*Thesis submitted for admission to the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, 1920.

In sixteen cases the first operation was not a laparotomy. The interval between operations varied from seven days to twelve years, but these figures have no bearing upon the cases, neither has the age of the patients, although both are noted in the case histories.

#### POSTOPERATIVE ADHESIONS

In those cases that had two or more laparotomies, sixty-seven were found to have adhesions. In a number of these cases it was impossible to tell whether or not they were the result of the previous operation, or due to the further advancement of a disease process.

1. Omentum adherent to peritoneal scar . . . . .	53
"      "      " adnexa . . . . .	3
"      "      " small bowel . . . . .	7
"      "      " large bowel . . . . .	2
"      "      " bladder . . . . .	2
"      "      " inguinal canal . . . . .	1
"      "      " uterus . . . . .	10
2. Large bowel adherent to uterus . . . . .	2
Small "      "      "      " . . . . .	6
Large "      "      " peritoneal scar . . . . .	2
Small "      "      "      "      " . . . . .	9
Large "      "      " adnexa . . . . .	6
Small "      "      "      " . . . . .	9
3. Multiple adhesions (2 T. B. peritonitis) . . . . .	13
Uterus adherent to parietal peritoneum . . . . .	2
Appendix adherent to right adnexa . . . . .	2

Glancing at these figures we are at once impressed with the fact that the greater number of these cases had adhesions between the greater omentum and the old scar in the parietal peritoneum. In the majority of cases the omentum was adherent directly to the scar; in a few, along either side. There is no doubt in my mind that the cause of this was due to two distinct conditions; i. e., poor technic and trauma. As Hertzler has stated in his magnificent work on the peritoneum, the rather old-fashioned way of using through-and-through sutures causes an irritation and trauma to the peritoneum which results in adhesions, due to retraction and turning-in of the peritoneal edges. In a number of cases operated upon a number of years ago, when this method was in vogue, there had been very extensive adhesions to the peritoneal scar. The present day method of using an over-and-over stitch to close the peritoneum is responsible for the formation of adhesions between the omentum and the scar; also the habit that some have of using tooth forceps to grasp the edges of the peritoneum when opening and closing the abdomen. Personally, I have adopted a continuous mattress suture, similar to the one advised by Jabez Jackson, that everts the peritoneal edges. I have had occasion to open the abdomen the second time in a number of cases in which this method was used and have noted the absence of any



adhesions where this procedure had been followed. The trauma caused by the use of the retractors and by the chemicals used in the sterilization of catgut, may also be responsible for this trouble. I am sure that the presence of iodine left on the skin when used in its sterilization, coming in contact with the omentum or intestines, will cause an injury to the endothelial layers of these organs and lead to the formation of adhesions. The careless use of sponges and packs may also lead to adhesions. It cannot be definitely stated just what caused the omental adhesions in the cases here presented, as in nearly every case there was some other intra-abdominal condition present producing symptoms. It can be readily seen that an adherent omentum can cause traction on the stomach and thereby produce a gastropnoxis and a chain of gastrointestinal symptoms.

We are always confronted with the fact that in breaking up adhesions, either primary or secondary, there is always a tendency to their recurrence; this is especially true of omental adhesions. It is known that while omental adhesions are, as a rule, not especially firm, they have not the power to loosen themselves as have other structures. In twenty-five cases it will be seen that the omentum was adherent to structures within the abdominal cavity. Those to the uterus were at points where the adnexa, on one or both sides, had been removed and were evidently due to some raw or denuded surface, or to the irritation caused by sutures. Adhesions to the bowel (generally the cecum) were caused by trauma at a previous appendectomy; and adhesions to the small intestine were due to irritation at the primary operation.

In nine cases the small bowel was adherent to the parietal peritoneum, and in two cases the cecum was adherent to it. Here we are faced with the problem as to whether or not it is best to cover the intestine by the omentum before closing the abdomen, or to leave it high in the cavity. Personally I prefer omental to intestinal adhesions to the peritoneal scar. In one case in which a right inguinal hernia had been done, the patient complained of persistent pain at the site of operation and at McBurney's point. Upon opening the abdomen a chronic appendix was found, and the omentum was adherent to the inguinal canal.

In one case where multiple postoperative intestinal adhesions were found, a previous Gilliam operation had been done, and a very early tubal infection had been overlooked. An enterostomy was necessary to relieve the obstruction; and later, when this was repaired, it was found that the intestinal adhesions had entirely disappeared. In the two cases where the uterus was found adherent to the abdominal wall, one had had a ventrosuspension, and the other a Gilliam operation in which the round ligaments had been drawn too tightly.

In a number of cases of pelvic inflammatory disease I am sure that if the primary operation had been postponed until the more acute condition had subsided and the pelvic cellulitis had disappeared, it would, in all probability, not have been necessary to perform a second operation.

In the enumeration of these cases a combination of adhesions occurred in the majority of cases varying from simple peritoneal agglutinations to true adhesions made up of connective tissue with their own blood supply.

#### THE UTERUS

1. *Chronic Metritis*.—Under this subheading will be taken up those cases in which a chronic metritic uterus was left at the primary operation, and because of the symptoms produced by menorrhagia and metrorrhagia, it was necessary to remove it at a second operation. In some of these cases the symptoms produced by the metritic uterus did not appear until after the first operation, but in others the symptoms were present and the organ should have been removed at that time.

I do not advocate a hysterectomy in every case of adnexitis by any means, but think that every case should be a law to itself. The age of the patient, her social status, and the pathology present should all be considered. In operations for bilateral pyosalpinx and chronic salpingo-oophoritis the uterus is, almost invariably, removed in our clinics as a routine measure; and yet the men who follow this routine practice in their clinical work, hesitate to do the same when operating upon their private patients; of course the pathology is frequently more evident and further advanced in the lower classes than in patients of higher social standing.

One is often in a quandary when operating for complicated tubo-ovarian inflammation, just how far he should go in the operation; not that there would be any great danger in removing tubes, ovaries, and uterus, but as to the after-effects upon his patient as regards menstruation, ovulation, and pregnancy. It is only after we have permitted a diseased uterus to remain and the patient develops a persistent menorrhagia or metrorrhagia that we regret our conservatism.

Polak has advocated resection of the fundus uteri in order to preserve the menstrual function in cases of an inflammatory condition of the uterus. In a few cases this may be done with success, but in cases of large, soft, and boggy uteri, a hysterectomy is, in my opinion, the only operation that will give the satisfactory results. Some men have gone to the other extreme and advocated panhysterectomy, and many points may be brought out in its favor, as shown by M. Roehard (Bull. de l'Acad., Nov. 1918); but, in my experience, and in the cases here presented, this operation was not performed. In the face of an extensive pelvic inflammatory condition, where the operation is more or less tedious there is an added risk from hemorrhage, wounding the ureters, infection, and shock. To remove the cervix does away with a valuable support to the vaginal vault. It is claimed that the remaining cervical stump is a focus for infection and for this reason it should be removed. I cannot agree to this; though I have only seen two cases in which trouble followed the nonremoval of the cervix, and both of these cases were hysterectomies

for fibroids. They cleared up nicely after a few local applications of iodine to the canal. To do this rather radical procedure, in the face of an acute condition and where there is considerable pus, is, I think, exceedingly poor judgment.

There can be no advantage in leaving even an approximately normal uterus in a patient where it is necessary to remove both tubes and ovaries; but it is much better to leave the uterus, and even a small amount of ovarian tissue, if possible, and allow these women to menstruate, even if it is scant, until it terminates in amenorrhea. Thus the menopause will come on gradually and without serious disturbance.

The terms chronic metritis, metritic uterus, and uterine fibrosis are entirely too broad and not quite correct. It remained for Shaw, of England, and Otto Schwarz, of St. Louis, to give us the exact pathology of the conditions of the uterus in combination with inflammatory disease of the adnexa. They have called attention to the fact that a true chronic metritis and a hypertrophied uterus are not so common as we have been led to believe and that the condition more often presented is a chronic subinvolution. I have been extremely fortunate in having had the benefit of Dr. Schwarz's experience and material. If we study carefully some of the pathologic pictures under the microscope, we are at once impressed with the fact that these changes are permanent and that it is impossible for them to disappear; and that, when they are present and are producing their characteristic symptoms, the rational thing to do is to remove the uterus.

In one case a metritic uterus had been fixed to the abdominal wall, according to Ochsner's suggestion of a "temporary ventrosuspension" where a salpingo-oophorectomy had been done, in order to prevent the uterus from becoming retroflexed and adherent. Case 21 was evidently one of chronic subinvolution and without a doubt a hysterectomy should have been performed at the primary operation. Case 25 is in the same class, but even with a diseased condition present she became pregnant. Case 34 required three laparotomies before obtaining relief. In Case 31 an incomplete operation had been done the first time in the presence of an infected uterus and of the left tube and ovary.

2. *Uterine Fibromyoma*.—In this class there were 12 cases in which the condition just described was present either at the first or subsequent operations. The condition was often accompanied by other diseases of the adnexa, such as cystic degeneration of the ovaries and chronic salpingitis.

In Case 4 (a negress) a supravaginal hysterectomy had been performed, but the patient continued to complain of pelvic disturbances; and when the abdomen was opened four years later, numerous pelvic adhesions were discovered, the omentum was adherent to the old peritoneal scar, the cecum to the right broad ligament, several coils of small bowel were bound to the left broad ligament, an ovarian cyst on the left side,



and two small myomata between the cervical stump and the bladder, which had been overlooked at the first operation or had developed since then.

Case 17 had both breasts removed for bilateral adenofibromata; at the same time a bilateral ovariectomy for ovarian cysts was performed; the uterus was found to be normal, but within a year the patient began to have severe metrorrhagia, and examination revealed an interstitial uterine fibroid. The metrorrhagia gradually disappeared, but the uterine tumor continued to grow. Five years after the first operation she had a severe uterine hemorrhage. A hysterectomy was performed and a large myoma removed.

Case 18, in which a myomectomy had been done, was operated upon three months later and found to be the victim of an active tuberculous peritonitis. No data could be obtained that would indicate the presence of this condition at the first laparotomy. Case 53 had a previous myomectomy and was later operated upon for chronic recurrent appendicitis; here it was found that the omentum had become adherent to the suture line of the uterus. If greater care had been observed in covering over the uterine wound, and if the appendix had been removed at the same time, the patient would not have been obliged to submit to a second operation.

Case 95 brings up the question of myomectomy versus hysterectomy. In this instance a myomectomy had been done without relief, and upon removing the uterus fourteen months later, the uterine wall was found to be studded with numerous small myomata. It may be of interest to state that the catgut used in the myomectomy was still present in the uterine wall.

We see occasionally cases in which some of the older and now abandoned gynecologic operations have been performed. Case 27 is one of them. A retrodisplaced uterus had been fastened to the anterior abdominal wall, according to Howard Kelly, and because of the pain and dragging of the old scar, the menorrhagia and metrorrhagia, a secondary laparotomy became necessary. Upon opening the abdomen the uterus was found tightly fastened to the parietal peritoneum and upon its fundus a fibroid, the size of an orange, had developed. The patient died, supposedly, of postoperative ileus.

The too frequent curettement for uterine bleeding is well illustrated in a number of cases. For diagnostic purposes, no operation is better; but as a curative measure, the operation is seldom necessary. This is illustrated in Case 29 in which two curettements had been performed without relieving the bleeding, and not until a myomatous uterus was removed, did the patient obtain relief.

A vaginal myomectomy rarely benefits our patients, because of the involvement of the uterus. I have seen a number of cases in which this had been the method of treatment, and later a hysterectomy was neces-

sary to relieve the patient. In those cases where we have a pedunculated uterine polypus and not a submucous myoma, a hysterectomy is not indicated. The mistake is made because of the failure of a pathologic examination. Case 57 is one in which a vaginal myomectomy had been done.

Case 59 is one in which a gross error was committed at the first operation, which caused the patient three years of mental anguish. A partial resection of the cervix had been done and, without a microscopic examination, the patient was told she had a carcinoma. When seen three years later, a blood examination revealed a three plus Wassermann, and a laparotomy a large myomatous uterus with a bilateral pyosalpinx. The patient made an uneventful recovery and is perfectly well today.

In Case 92 an injury to a bowel resulted in fecal fistula. This is rather unusual in hysterectomies for fibroids; injuries to the bladder and ureters are more common. In Case 97 lack of judgment in the selection of the proper operation and failure to make a correct diagnosis is self-evident; an anterior colporrhaphy and perineorrhaphy was done in the face of a retroverted uterus which was beginning to undergo a descensus; the displacement being due to a fibroid on the posterior uterine wall. This led to a second operation.

3. *Carcinoma of the Uterus.*—While hardly in the province of this paper to bring up the subject of cancer of the uterus, I cannot help mentioning one case, No. 56, a patient age 56, in whom a vaginal hysterectomy was done for adenocarcinoma of the cervix. Seven years later she came under my care complaining of a bloody vaginal discharge, and upon examination a small metastatic nodule was observed in the upper angle of the left side. A laparotomy was performed; the bladder was dissected away from the vaginal scar and a portion of the vaginal vault was resected together with the nodule; the vaginal wound was closed. Five years have passed since the second operation, and there has been no evidence of a recurrence.

4. *Retrodisplacements of the Uterus.*—In this list are placed those cases in which the uterus was found retrodisplaced, either at the first or previous operations. The cases in which a retroverted metritic uterus was found, and removed, are not included in this table. The character of the operations performed to correct the displacement was as follows:

I.

A. Gilliam operation . . . . .	17
B. Anterior plication of round ligaments . . . . .	3
C. Webster-Baldy . . . . .	4
D. Ventrofixation . . . . .	2
E. Internal Alexander . . . . .	1

II.

A. Bad results from first operation . . . . .	10
B. Incomplete operation . . . . .	6

## I.

*A. Gilliam Operation.* As an operation of choice I much prefer the Gilliam operation, and especially with its modification by Crossen. There has been some adverse criticism as to its causing intestinal obstruction. I have not seen reports of more than five such cases. In about 150 Gilliam operations, which I have either assisted or operated myself, I have never observed this complication. If the distal end of the ligaments are drawn tightly against the parietal peritoneum, it is almost impossible for an ileus to occur. In a paper read before the Missouri State Medical Association in 1917, I reported a number of cases where excellent results have been obtained from this operation for sterility caused by retrodisplacement of the uterus. A great number of operations for retrodisplacements are done which are unnecessary; only those cases where the displacements produce symptoms, should be corrected. A subinvolute retroverted uterus should not be operated upon until a pessary and other local treatments have been tried.

In Case 20 one of the round ligaments was not properly fastened and had broken loose. If this ligament had been "fanned" out over the fascia and sewed with interrupted sutures, this accident would never have occurred.

Case 24 illustrates the failing of trying to hold up a uterus that is low in the pelvis by fastening the round ligament on the anterior surface. The ligaments not only stretched, but the uterus underwent a descensus.

In Case 28 an incomplete operation had been done previously. A cystocele, with a uterus that has undergone a partial descensus, can only be corrected by either an anterior colporrhaphy and a Gilliam or a Watkins operation (three other cases were in this class).

In Case 64 the round ligaments had been drawn through the fascia too far and fastened, causing the uterine fundus to come in contact with the peritoneum. Two cases were in no way connected with a Gilliam operation; the fundus was abutting against the peritoneal wound and, therefore, became adherent. Two other cases had had previous laparotomies for pelvic conditions. An examination and the patient's history had failed to call attention to the existence of a retroverted uterus. Case 95 had a myomectomy and a Gilliam at the first operation, but more fibroids developed and a hysterectomy had to be performed 14 months later.

*B. Anterior Plication of Round Ligament.*—In four cases this operation was done. In the last three the results were bad; and, personally, I do not advocate this operation.

*C. Webster-Baldy Operation.*—In case 16 this operation had been done, but the condition found at the operation two years later could in no way be connected with the first operation. The cause of these



dense adhesions between the bowels and parietal peritoneum could not be associated with the operation. The adnexa were negative. Three other cases may be placed in this class. They were young unmarried women, and the results were good as far as the correction of the displacements was concerned.

*D. Hysterectomy for Prolapsus.*—In Case 83 an ill-chosen operation had been performed with the result that the patient developed a complete vaginal hernia. A perineorrhaphy and laparotomy, with the fixation of the cervical stump in the abdominal wall, gave excellent results.

*E. Internal Alexander Operation.*—In Case 68 this operation had produced a marked antelexion of the uterus causing dystocia. A cesarean section had to be done to relieve her. Both mother and child lived.

*F. Ventrofixation Operation.*—Until recently there was considerable hesitancy about removing a uterus where inflammatory disease of the adnexa was present. Under "Chronic Metritis" are listed severe cases in which a large, soft, boggy uterus has been left and an attempt was made to hold it forward by one of the many round ligament operations. Ochsner, about ten years ago, advocated an operation which he called "temporary ventrofixation;" its object was to hold in place temporarily a retroverted and fixed uterus in the presence of adnexitis to avoid its dropping back and again becoming adherent. I plead guilty to having done this operation several times, but have recognized the error of it and abandoned the operation. I now have a case under observation in which I did this operation six years ago, and at the same time removed two large pus tubes. The patient has continuous pelvic pain and a marked retraction of the lower angle of the old scar, due to the pulling downward of the fastened uterus.

## II.

*A. Bad Results Following First Operation for Retroversion.*—In Case 22, a Gilliam was done some time after examining the case; in the interval she contracted a gonorrhea, which was not observed at the time of the operation. The result was an acute pelvic peritonitis. In Case 72, a Gilliam was done in this patient who had a narrow pelvis and, when she became pregnant and went into labor, it was necessary to perform a cesarean section; but mother and child lived. Mention has already been made of the dystocia caused by an internal Alexander operation resulting in a cesarean. There are several other cases that come under this heading that have been taken up under the different operations for retrodisplacements of the uterus.

*B. Incomplete Operation.*—Only in Case 44 did the Gilliam operation fail to give relief. In this case a diseased coccyx caused the severe back-ache which was attributed to the retroversion.

## III.

*Retroversion with and without Fixation.*—There are six cases in this class that were found at the second laparotomy. When a chronic metritis was present a hysterectomy was done. When the uterus was not diseased, the displacement was corrected by a Gilliam operation.

## IV.

*Postoperative Hernia.*—Under this heading are listed 15 incisional hernias following laparotomies which were repaired secondarily.

A.1. McBurney incisions . . . . .	5
2. Midline incisions . . . . .	9
3. Umbilical . . . . .	1
Postoperative hernia developed in the following wounds	
B.1. Clean wound . . . . .	3
2. Infected wound . . . . .	4
3. Drainage cases . . . . .	6

A. 1. In one case an appendectomy, without drainage, was necessary; but shortly after the operation a fecal fistula developed. Evidently the appendix had not been tied off, nor the stump properly inverted and sewed over, and abscess developed at the cecum. The hernioplasty, performed eight months later, was successful.

Three cases were suppurative cases to begin with, and had badly infected wounds; another was a suppurative appendectomy that caused a secondary pelvic infection. The second operation was for a postoperative hernia at McBurney's point, and then a midline incision was made in order to deal with the pelvic condition.

A. 2. Of the nine midline incisional hernias, three followed clean laparotomies, three after inflammatory postoperative wounds, and two followed pelvic drainage cases. Of the clean cases one, Case 65, occurred after the third laparotomy; the second occurred in an unusually fat patient. The cause in the third case was undetermined. In Case 90, having an inflammatory postoperative wound, the hernia did not develop until the patient became pregnant and was delivered. Case 92 had a fecal fistula following a hysterectomy. A third developed soon after the infected wound had healed.

A. 3. One case of umbilical hernia recurred after labor; another operation proved successful and to date shows no evidence of weakening. Case 10 is of interest in that a right inguinal herniotomy had been done which failed to relieve the symptoms. A laparotomy revealed a chronic appendicitis and the omentum adherent within the interior ring.

*Postoperative Fistulas and Sinuses.*—Under this heading are seven cases; two postoperative discharging sinuses, and five fecal fistulae. In both of these postoperative sinus cases the tract led to an infected adnexa that had not been removed at the previous operation of the fecal

fistulae. One case developed after a simple appendectomy (mentioned under hernias). Case 22 was made to relieve an intestinal obstruction following a Gilliam operation. It was repaired with good results. Two cases followed hysterectomies, one for fibroid and the other for a chronic metritis. One case followed a partial hysterectomy for tuberculous infection. This case died.

In a discussion of fecal fistula following pelvic operations, it is strange that there are not more of these injuries considering the amount of this kind of surgery done by inexperienced men. Another fact to be considered is that a great majority of the fistulae will close spontaneously. In the removal of tightly adherent pus tubes from the left side, the rectum is frequently implicated to such an extent as to result in fistulae; but the cases I have seen have always healed of their own accord. A good rule to follow in the removal of pus tubes is to free and remove the right adnexa first, and thus have as clear a field as possible when attacking the left side and thus avoid injury to the rectum.

#### THE APPENDIX

Under this heading are included those cases in which the appendix was removed either for a primary diseased condition, as a routine, or a secondary operation.

(a) Appendectomy (primary operation) . . . . .	35
(b) Secondary operation . . . . .	13

In these two varieties of cases are those appendices that were removed either alone or in connection with some other operation. If they were removed previously they were diseased; or, if removed at the time of some other operative procedure, they were either diseased, or removed as a routine practice. The second class (b) are those removed at secondary laparotomies.

In 17 cases an appendectomy alone was done, and of this number five were suppurative. As this paper only deals with secondary operations, these cases were reoperated for various conditions. In one clean case, (already mentioned) a fecal fistula developed. Several cases had the appendix removed when some other pathology was the cause of the patient's symptoms. In eight cases of this number, an appendectomy was done when some right adnexal condition was responsible for the trouble. How often we see a small "gridiron" incision made, the appendix removed, and no exploration of the pelvis made! The neglect may even extend further, i. e., not even a vaginal examination is made.

In 22 cases the postoperative complications were found, either due to a previous appendectomy, or to an appendix that should have been removed at the first operation. Postoperative hernias are included. Case 9 was a clean case, but in consequence of the inexperience of the first operator, the appendix was not even found. At the second laparotomy



it was easily located and removed. In 9 cases the omentum was adherent to the scar, and in 6 other cases the small intestines were adherent to the old incision. In 6 cases the cecum showed marked adhesions at the site of the previous incision. In one case the cecum was adherent to the right broad ligament. Two cases were adherent to the right adnexa; and in two other cases adhesions were found between the cecum and the omentum; and in one case the adhesions were between the cecum and small bowel. The only explanation of this condition existing at the point where the appendix was removed is that raw surfaces were left at the previous operation. In two cases the appendix was found adherent to the right adnexa.

Under the subject of appendicitis in women, there are three striking points brought out by the above figures: (1) Postoperative hernia; (2) postoperative adhesions; (3) the neglect of the appendix at the first operation. The first condition can be corrected in most cases by stab wound drainage; the second by a more careful technic; and the third by an appendectomy in every woman in whom the abdomen is opened for some other condition.

#### VAGINAL OPERATIONS

*A. Curettement.*—There are several cases where a curettement was done in connection with other vaginal operations; but these will not be taken up as they are not worthy of note. There are 4 cases in which a curettement was done, not as a diagnostic, but as a curative measure. Cases 25 and 26 each had a curettement for a menorrhagia when the condition present, chronic metritis, required hysterectomy. Two cases had a curettage in the presence of fibroids. Two other cases had the same operation when the real condition was one of ruptured tubal gestation. Three of the cases had curettements for dysmenorrhea.

The diagnostic points in fibroid of the uterus are often difficult to determine, and it is only by exploring the cavity of the uterus that we are able to establish the diagnosis; but there is hardly an excuse for a curettement in the presence of a ruptured ectopic pregnancy. Personally, I see no place for a curettage in dysmenorrhea, sterility, or an incomplete abortion. Mosher, of Kansas City, has brought this latter point forcibly before the profession.

*B. Perineorrhaphy and Trachelorrhaphy.*—Perineorrhaphy: In this list are 15 operations for lacerations of the perineum of which 13 were primary and 2 secondary. Ten of these perineorrhaphies were done in connection with other pelvic work; three of them required reoperation due to failure of the first operation. Two cases should have had an anterior colporrhaphy at the time the perineorrhaphy was performed. Case 44 was done when the greater amount of trouble was due to an old fracture of the coccyx. One case had a retroverted uterus at the time the perineorrhaphy was made and should have been corrected then.

In Case 63 a hysterectomy for procidentia was done, and a badly lacerated perineum was left unrepaired. The result was a large vaginal hernia that necessitated a perineorrhaphy and a laparotomy in which the cervical stump was fastened in the old wall; the result was excellent. In Case 97 a myomatous and retroverted uterus was overlooked at the time the perineum was repaired, and this necessitated a second operation.

In a number of these cases poor judgment and a careless and indefinite diagnosis made it necessary for the women to be subjected to a second operation. This mistake is often made in the reverse way,—a retroverted uterus is corrected and a lacerated perineum with a cystocele is neglected.

*Trachelorrhaphy.*—This list includes 12 operations of which 11 were done primarily in connection with other operations; and one was done at the second sitting. In these cases very little or no improvement was obtained by the operation and, generally, some overlooked pelvic disease was the cause of most of the symptoms. A lacerated cervix very seldom gives rise to symptoms other than a leucorrhea; but we well know that if left unrepaired it may result in the development of malignant disease.

*Curettements.*—In this list are 12 operations; there were probably more, but they were not recorded. Two cases were for an incomplete septic abortion, three for a chronic endometritis, two for uterine hemorrhage in which a ruptured ectopic was later discovered, and two for menorrhagia in which a fibroid was present and the uterus removed subsequently. This operation, I think, will be employed less and less, except for diagnostic purposes.

*Anterior Colporrhaphy.*—There were five cases in which this was done; three as the first, and two as the second operation. In two cases a perineorrhaphy alone was done. A good result was obtained in Case 44, but a diseased coccyx was overlooked. In another case the operation gave good results, but an intraabdominal condition was neglected. In Case 97 this operation was improperly used; what should have been done was a Watkins operation.

In those cases where I have performed anterior colporrhaphy, I have always done some intraabdominal operation to hold up the uterus which is either retroverted or has undergone descensus or both. I have never had a recurrence. In women past the menopause the Watkins interposition operation has given excellent results in my hands.

#### OPERATIONS UPON THE ADNEXA

In this list are placed those cases in which a secondary laparotomy was necessary, due to conditions arising from the previous operation, or a new diseased condition, or an advancement of the disease originally present. It is not necessary to quote from the literature, except that excellent paper of Polak's on the "End Results of the Conserved Ovary," (Trans. Am. Gynec. Soc., 1918). I think one of the greatest questions

confronting the gynecologist refers to the best treatment for patients who are the victims of diseased ovaries and tubes. The pendulum has swung too far in both directions, the too radical operation of the past, and the too conservative treatment of later days. The question that nearly all patients ask before we operate is "Will it be necessary to remove my ovaries?" It is a great question, and we answer it by saying that we will only do that which is necessary to make her a well woman. We must learn by study and experience what the microscopic conditions of the tissues present are by their macroscopic appearance. Thus, much will depend upon our surgical judgment. How often do we see a case in which a bilateral salpingo-oophorectomy has been done and a badly diseased uterus left behind, or, if not diseased, to leave it retroflexed.

Reuben Peterson ("Preservation of the Ovaries, Entire or in Part, in Supravaginal or Panhysterectomy") claims that it is not necessarily true that younger women suffer more from a surgical menopause than older ones. This has been borne out in my own experience, neither does Bovee agree with this statement.

In gonorrhea of the tubes, a unilateral infection is seldom or never present, and to remove only one tube is to leave the operation incomplete.

Surgical technic is a beautiful feature; but when, where, and how to use it, can only come with training and experience. It is seldom that we see a wedge-shaped section removed from the uterine cornu when a salpingectomy is done, and the round and broad ligament fastened over this area; and yet how necessary it is that this be done, as there are small glands in this location which are, as a rule, infected and, if left, will later give rise to trouble. Little thought is given as to which is the first tube to be removed in a case of bilateral pyosalpinx; yet how much easier and safer it is to remove the right tube first and thus clear the field to avoid injury to the rectum. After one has torn the rectum several times, he learns to approach these structures with more respect.

The question of cystic degeneration of the ovaries is a hackneyed subject; yet it is one that up to this day has not been satisfactorily settled. In the past the ovaries were removed for dysmenorrhea, later resected; in both instances good and bad results were obtained. We now know that all dysmenorrhea cases are not due to cystic ovaries. The cirrhotic ovary is one that, in young women, gives rise to considerable trouble; and yet, when this condition is bilateral, we hesitate to remove both organs. In salpingectomy the circulation of the ovaries is frequently disturbed; later this may lead to cystic degeneration and necessitate another operation. The cases here reported, in which the ovaries have been resected, show rather poor results due either to the reformation of cysts, or to raw surfaces for the attachment and formation of adhesions. The small cysts in ovaries are nearly always multiple and, unless the greater portion of the ovary is resected, their removal had best not be



attempted. Davis and Curtis, of Chicago, (Chic. Gynee. Soc., Apr., 1916) have shown us that a large percentage of ovaries are infected when the tubes are involved, in 9 out of 11 cases; this also applies to ovaries in the presence of fibromyoma of the uterus and chronic appendicitis.

Removal of both ovaries at 1st operation . . . . .	11
“ “ “ “ “ 2nd “ . . . . .	13
“ “ “ “ “ 1st “ . . . . .	26
“ “ one ovary “ 1st “ . . . . .	18
“ “ both ovaries “ 2nd “ . . . . .	13
Resection of ovaries at 1st operation followed by removal at 2nd operation . . . . .	9
Resection of ovaries at 1st or 2nd operation . . . . .	7
Ovarian cysts . . . . .	5
Appendectomy, followed by second operation for diseased ovaries . . . . .	11

The enumeration of the cases in which both ovaries were removed at the first operation does not include oophorectomies done in connection with a hysterectomy for a myomatous uterus. In Cases 11 and 21 a bilateral salpingo-oophorectomy was performed and the operation was incomplete at that. In the first case a retrodisplaced uterus was not replaced; and in the latter, a metritic uterus was left behind.

Two other points of interest are: nine cases, that had primary resection of the ovary, necessitated an oophorectomy at a second operation; and that in eleven cases, in which a primary appendectomy was done, a diseased condition of the right ovary was found at the second operation; of the latter interesting point, I think, the relationship is too often overlooked and that the reverse is found; that is, a diseased condition of the right ovary and tube causing a secondary infection of the appendix.

#### TUBES

Removal of both tubes at first operation . . . . .	19
“ “ “ “ “ second “ . . . . .	4
“ “ one tube “ first “ . . . . .	21
“ “ both tubes “ second “ . . . . .	19
“ “ “ “ “ “ “ . . . . .	8
“ “ one tube “ “ “ . . . . .	10

The striking point in the above figures is the fact that in 19 cases it was necessary to remove a remaining tube at a secondary operation. It certainly goes to show that there was too much conservatism at the first operation. As the majority of the tubes were infected by the gonococcus, the well-known fact is demonstrated that unilateral gonorrheal infection of the tube is very rare. I am quite sure that a number of salpingitis cases, either due to a distinct gonorrheal infection, or to a postabortal infection, were operated upon entirely too early; and that, if “watchful waiting” had been practiced, the results would have been better, and there would have been fewer postoperative complications.

Case 50 is rather a unique one and is worthy of mention. History: The patient was under my care for a bilateral salpingitis, receiving local treatments preparatory to an operation at a later date. One day she was taken suddenly with severe pain in her right side. When I arrived at her home, I found her in a state of profound shock. She was hurried to the hospital and a laparotomy was done immediately and revealed a ruptured right pyosalpinx with a left salpingitis intact. She made a nice recovery, but suffered an intestinal obstruction due to postoperative adhesions. Six months later a second laparotomy was performed to relieve her condition.

Two cases were instances of ruptured tubal gestation. They were overlooked in the preliminary curettement.

#### CONCLUSIONS

1. A more careful manipulation of all abdominal structures to minimize trauma, and thus prevent the formation of postoperative adhesions is essential.

2. A more careful study of the tissue before us when the abdomen is open, and the avoidance of too conservative measures when the pathology present demands radical measures.

3. The removal of every appendix in women when the abdomen has been opened.

4. That conservative measures are rather unsatisfactory when dealing with "cystic ovaries."

5. Conservative operative measures used in dealing with tubal infection should be abandoned.

NOTE: Through lack of space, only those cases cited in the text are listed below.

#### BRIEF CASE HISTORIES

CASE 3.—Age twenty-eight. First operation: Bilateral salpingectomy for salpingo-oophorectomy with ventrofixation for a retroflexed and adherent uterus; appendectomy; resection of both ovaries. Postoperative history: Persistent pelvic and abdominal pain, menorrhagia; dysmenorrhea; profuse leucorrhea. Second operation, 4 months later: Findings, chronic metritic uterus and omentum tightly adherent to parietal peritoneum; cecum adherent to right horn of uterus; coil of small bowel adherent to left broad ligament; remains of both ovaries present and cystic. Hysterectomy, freeing of all adhesions, removal of all degenerated ovarian tissue.

CASE 4.—Age thirty. Supravaginal hysterectomy for fibroid uterus; appendectomy; left oophorectomy. Postoperative history: Pain for last two years in lower left quadrant. Second operation, 4 years later: Omentum adherent to sear; left ovary adherent to omentum, several coils of small bowel, and to the bladder; cecum adherent to right broad ligament; 2 small myomata in uterine stump. Operation: Freeing of all adhesions; removal of cyst and two myomata.

CASE 9.—Age twenty-two. Supposed appendectomy for chronic appendicitis. Postoperative history: No improvement. Second operation, 4 weeks later: Appendix removed; no adhesions or pus.

CASE 17.—Age forty-three. Adenofibroma of both breasts. Bilateral ovarian simple cysts. Operation: Removal of both breasts and ovarian cysts. Postoperative history: Occasional menorrhagia and metrorrhagia with pelvic pain; second curettement. Third operation, 7 years later: Findings, submucous and large interstitial uterine myoma; no evidence of either tubes or ovaries. Operation: Supravaginal hysterectomy.

CASE 18.—Age forty-six. Abdominal myomectomy for uterine myoma. Postoperative history: Persistent abdominal pain and abdominal distention. Second operation, three months later: Findings, tubercular intestinal peritonitis; uterus and adnexa, negative; multiple interior adhesions. Operation: Exploratory laparotomy. Recovery.

CASE 20.—Age twenty-two. Supposed Gilliam operation and appendectomy. Postoperative history: No improvement since first operation; persistent backache; dysmenorrhea; pain in pelvis; uterus found retroverted. Second operation, three months later: Findings, omentum adherent to old scar; uterus retroverted and low in pelvis; right round ligament adherent to parietal peritoneum; left one free; coil of ileum adherent to peritoneum at point where right round ligament was fastened to abdominal wall; left ovary cystic; left tube showed old inflammatory changes and was adherent to left broad ligament. Operation: All adhesions freed; left salpingo-oophorectomy; Gilliam operation completed; old skin scar resected.

CASE 21.—Age forty. Bilateral salpingo-oophorectomy for chronic postabortal inflammatory condition; appendectomy. Postoperative history: menorrhagia; persistent leucorrhea. Second operation, 5 months later: Findings, chronic metritis; uterus retroverted and fixed. Operation: Supravaginal hysterectomy.

CASE 22.—Age thirty-eight. Gilliam operation for retroversion. Postoperative history: General peritonitis and postoperative ileus. The operation was evidently done in the presence of an acute gonococcus salpingitis. Second operation, 3 weeks later: Findings, multiple intestinal adhesions with pelvic abscess; multiple intestinal obstruction. Operation: Enterostomy (artificial fecal fistula); drainage. Third operation, 6 months later: Findings, no evidence of any intestinal adhesions. Operation: Fecal fistula closed. Recovery.

CASE 24.—Age thirty. Anterior plication of round ligaments for retroversion and bilateral salpingectomy with partial resection of right ovary for cystic degeneration. Postoperative history: Dysmenorrhea; continuous backache. Second operation, 11 months later: Findings, omentum adherent to old scar; uterus retroverted and low in pelvis; sigmoid adherent to right broad ligament where tube had been removed; one coil of small bowel adherent to fundus of uterus; both ovaries cystic. Operation: Freeing of all omental and intestinal adhesions; removal of right and partial resection of left ovary; Gilliam operation. Postoperative history: Surgical menopause, relieved by corpus luteum extract.

CASE 25.—Age twenty-four. Chronic endometritis; lacerated perineum and cervix. Operation: Curettement; trachelorrhaphy and perineorrhaphy. Postoperative history: Pain in right side with dysmenorrhea. Second operation, 11 months later: Findings, retrocecal and adherent appendix; cystic left ovary; omentum adherent to old scar. Operation: Appendectomy; removal of left ovary; freeing of adhesions. Postoperative history: Continued pelvic pain; menorrhagia. Third operation, 2 years later: Findings, omentum adherent to old scar and to fundus of uterus; uterus enlarged and soft; chronic subinvolution. Operation: Supravaginal hysterectomy with removal of the tubes.

CASE 26.—Age twenty-seven. Operation: Curettement for menorrhagia. Postoperative history: No improvement. Second operation: Curettement. Postoperative history: No improvement. Third operation, 4 years later: Supravaginal



hysterectomy for chronic metritis, chronic endometritis, and chronic salpingo-oophoritis.

CASE 27.—Age forty-five. Ventrofixation for retroverted uterus. Postoperative history: Painful scar; menorrhagia and metrorrhagia. Second operation, 4 years later: Findings, omentum adherent to scar causing retraction of skin scar; uterus adherent to parietal peritoneum; fibroid on upper anterior uterine surface. Third operation: Supravaginal hysterectomy. Postoperative history: Died. Cause: Postoperative ileus (?).

CASE 28.—Age thirty-nine. Lacerated perineum with rectocele and cystocele. Operation: Perineorrhaphy. Postoperative history: Continued rectocele and cystocele. Second operation, 10 months later: Anterior colporrhaphy and Gilliam operation.

CASE 29.—Age forty-three. Two curettements for menorrhagia. No improvement. Third operation: Supravaginal hysterectomy for myomatous uterus.

CASE 31.—Supposed salpingo-oophorectomy for pyosalpinx; drainage. Postoperative history: Two discharging sinuses in skin wound; continuous pain in right side; frequent and painful urination; digestive disturbances. Second operation, 6 months later: Findings, omentum and several coils of small bowel adherent to old scar; bladder adherent to several coils of small bowel; appendix adherent to right broad ligament; uterus enlarged and soft; left salpingo-oophoritis. Operation: Freeing of all adhesions; supravaginal hysterectomy for chronic metritis; removal of left tube, ovary, and appendix.

CASE 34.—Age twenty-two. Right salpingo-oophorectomy for chronic gonococcus infection. Postoperative history: Pelvic pain; dysmenorrhea; leucorrhea. Second operation, 7 months later: Findings, left ovary cystic and adherent to a coil of small bowel. Operation: Freeing of adhesions and left oophorectomy. Postoperative history: Continued dysmenorrhea; menorrhagia. Third operation, 4 months later: Findings, chronic metritis; right chronic salpingitis; left broad ligament cyst. Operation: Supravaginal hysterectomy; right salpingectomy; removal of left broad ligament cyst.

CASE 44.—Age forty-two. Anterior colporrhaphy; perineorrhaphy; Gilliam operation and myomectomy (for subserous myoma). Postoperative history: Patient still complained of severe pain in back as before first operation. Second operation, 1 year later: Removal of distal end of coccyx for an old fracture of this bone. Postoperative history: Complete relief.

CASE 50.—Age forty-four. Spontaneous rupture of chronic pyosalpinx (right); left chronic salpingitis; right chronic oophoritis. First operation: Bilateral salpingectomy and right oophorectomy. Postoperative history: Acute intestinal obstruction due to postoperative adhesions six months after first operation; multiple intestinal adhesions. Second operation: Freeing constricting band of adhesions. Recovery.

CASE 53.—Age thirty-four. Trachelorrhaphy; Gilliam operation; myomectomy (subserous myoma); left oophorectomy (left cystic ovary). Postoperative history: Pain in right lower quadrant and over symphysis. Second operation, 2 years later: Findings, chronic appendix; adhesions of omentum to fundus and to old scar. Operation: Freeing of adhesions and appendectomy.

CASE 56.—Age fifty-six. Vaginal hysterectomy for adenocarcinoma of cervix. Postoperative history: Seven years later developed a metastatic nodule in upper left angle of vaginal scar. Second operation, 7 years later: Resection of vaginal vault. Five years have elapsed since second operation and no signs of recurrence.

CASE 57. First operation: Two myomata removed per vagina. Second operation, 7 years later: Large ovarian cyst removed (left side). Postoperative history: Pain and pressure in pelvis; bladder symptoms. Third operation: Findings, large ovarian cyst right side; intramural fibroid. Operation: Hysterectomy and right ovariectomy.

CASE 59.—Age thirty-one. First operation: Amputation for supposed carcinoma of cervix. Postoperative history: Continued uterine bleeding (patient had a 4-plus Wassermann). Second operation, 3 years later: Findings, interstitial uterine myoma and bilateral pyosalpinx. Operation: Panhysterectomy.

CASE 63.—Age eighteen. First operation: Appendectomy. Postoperative history: No improvement; constant pelvic pain; dysmenorrhea. Second operation, 3 months later: Findings, chronic bilateral salpingo-oophoritis (condition said to have been present before first operation); omental adhesions to old scar. Operation: Bilateral salpingo-oophorectomy; freeing of all postoperative adhesions.

CASE 64.—Age thirty-three. First operation: Gilliam for retroversion. Postoperative history: Dysmenorrhea and pelvic pain. Second operation, 6 months later: Findings, omentum adherent to old scar and to uterine fundus; uterine fundus adherent to anterior parietal peritoneum. Bilateral salpingo-oophoritis. Operation: Freeing of adhesions; bilateral salpingo-oophorectomy.

CASE 68.—Age thirty-three. First operation: Internal Alexander operation for retroversion. Postoperative history: Pregnancy; dystocia due to acute anteverted uterus. Patient in labor 40 hours. Operation: Abdominal cesarean section (living child). Recovery.

CASE 72.—Age twenty-seven. Atresia of cervix; retroverted uterus; sterility. First operation: Dilatation of cervix; Gilliam operation; appendectomy. Postoperative history: Became pregnant four months after operation; in labor 32 hours; dystocia due to large fetus and small pelvis. Operation, 13 months later: cesarean section. Live child.

CASE 90.—Age twenty-nine. First operation: Right salpingo-oophorectomy. Postoperative history: Suppuration of abdominal wound; incisional hernia developed after pregnancy and delivery two years after first operation. Second operation, 3 years after first operation: Findings, postoperative ventral hernia; omentum adherent to hernial sac. Operation: Ventral herniotomy.

CASE 92.—Age forty-two. First operation: Supravaginal hysterectomy for fibroids. Postoperative history: Incisional hernia and fecal fistula; multiple adhesions. Second operation, 6 months later: Attempt to close fistula and hernia. Third operation, 1 year later: Closure of hernia and dissection of fistulous tract. Operation successful. Recovery.

CASE 95.—Age thirty-six. First operation: Myomectomy for subserous myoma; Gilliam operation for retroverted uterus. Postoperative history: Pain in lower abdomen; menorrhagia. Second operation, 14 months later: Findings, uterus adherent to parietal peritoneum; fundus and anterior surface studded with small myomata; cystic right ovary and chronic appendicitis. Operation: Supravaginal hysterectomy and appendectomy. Note: On section uterus was found to contain numerous subserous and interstitial fibroids; scars of old previous myomectomy were visible with shreds of 2 chronic catgut sutures present.

CASE 97.—Age thirty-three. First operation: Perineorrhaphy and anterior colporrhaphy. Postoperative history: Marked adhesions of uterus with retroversion. Second operation, 16 months later: Findings, retroverted uterus with myoma on post surface; bilateral salpingitis with right cystic ovary. Operation: Myomectomy; Gilliam operation; bilateral salpingectomy; resection of right ovary.

## CHRONIC ENDOCERVICITIS

A PARTIAL REVIEW OF THE LITERATURE WITH AN INTRODUCTORY PARAGRAPH ON THE SURGICAL USE OF ETHYL ALCOHOL AND A PRELIMINARY REPORT OF THE TREATMENT OF ENDOCERVICITIS WITH ETHYL ALCOHOL INJECTED INTERSTITIALLY, ILLUSTRATED BY CASES

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### INTRODUCTION

FROM the viewpoint of the clinician, endocervicitis with its sequences is the most vital gynecologic condition. Like many other inflammatory conditions, less is reported about the results than the method of treatment, consequently one has to select by experience those methods which have given the best results.

In this article the author will endeavor to discuss the uncomplicated condition, not including tuberculous or syphilitic endocervicitis, and make a preliminary report upon its treatment with ethyl alcohol injected interstitially. Since the treatment is based upon an analysis of the success of the surgical use of alcohol in some other pathologic conditions, a brief review of the literature may justify its particular application to this sphere of surgery.

Alcohol holds an important place as an antiseptic. It has been used locally in the treatment of abscesses and ulcers with results little different from those obtained with hypertonic salines and inferior to those obtained with Dakin's hypochlorous acid. However, injected interstitially it possesses entirely different properties. The pathologic conditions successfully treated were nerve lesions. Jonnesco<sup>1</sup> has contributed much toward the physiology of the sympathetic nervous system and the part played by lesions irritating it. Laignel-Lavastine<sup>2</sup> discovered congestion, small round-cell infiltration and patches of necrosis in the abdominal ganglia of cases dying from infective diseases. He found sclerosis or inflammation of the solar plexus in different forms of mental disease especially in cases with delusions of abdominal disease. D'Amato and Maeri<sup>3</sup> found parenchymatous and inflammatory changes in the sympathetic ganglia associated with acute and subacute gastritis experimentally produced in animals and with chronic gastritis in man. Stilling<sup>4</sup> discovered neuritis of the splanchnic nerve in which ascites, enlargement of the liver, and dyspnea were prominent factors. Fleming<sup>5</sup> described interstitial and parenchymatous neuritis, the pathology in the former showing exudate to be most marked near the vessels, and leuco-



cytes may be seen in the effused lymph especially around the vessels. Dana<sup>6</sup> found no change in the nerve elements but an endarteritis of the vessels of the nerve sheath. Putnam<sup>7</sup> found the same endarteritis but also changes in the nerve elements and in the endoneurium. Horsley<sup>8</sup> found no change in the vessels but change in the nerve elements. Krause<sup>9</sup> found here and there thickening in the nerve sheath accompanied by thickening of the nerve fibers; in all cases the arteries were normal. Head<sup>10</sup> found normal ganglion cells with perhaps some thickening of the periganglionic tissue but this was doubtful. Schlösser<sup>11</sup> suggested in 1907 that the affected branches of the nerve should be destroyed by injection of alcohol at the point where they leave the base of the brain. This method has been used by Sicard<sup>12</sup> in France, Harris<sup>13</sup> and Stewart<sup>14</sup> in England. Head says that "a solution of absolute alcohol with or without eucaine or stovaine, is injected around the nerve. \* \* \* After the first outburst produced by the injection, pain disappears for ten months or more, and in some cases is said not to have returned. The area on the face supplied by the injected branch should become insensitive to the same extent as if the nerve had been completely divided." Yeomans<sup>15</sup> reports the successful treatment of coccydynia with an hypodermic injection of ethyl alcohol, 70-80 per cent, in the tissue about the coccyx. Hartel<sup>16</sup> and Byrnes<sup>17</sup> report its successful use in the treatment of trigeminal neuralgia. Sicard has abandoned all reagents in favor of ethyl alcohol in the treatment of neuralgias. He found that the injection of the nerve below the lesion provocative of the causalgia does not cause a cessation of the causalgic pains. Pitres<sup>18</sup> and Marchand found that when treating causalgic pains consecutive to war wounds if the nerve were not relieved of pain by severing, the supralesional injection caused cessation of causalgic pain. Huber<sup>19</sup> reports experimental nerve section and repair demonstrating that the injection of about .5 c.c. of absolute alcohol 1 cm. from the proximal end of a section nerve obviates (1) the formation of an amputation neuroma; (2) the proliferation of connective tissue ends; and (3) the proliferation of sheath cells.

An analysis of the pathologic study and treatment of nerve lesions points to the presence of perineural foci of inflammation, the commonest cause of which is bacteria. We have examples of certain bacteria which send their toxins from a focus to irritate the nervous system, examples being bacillus tetanus, bacillus diphtheria, and certain streptococci. If some bacteria can emit toxins to affect distant nerves others can as easily locally diffuse their toxins to irritate adjacent nerve fibers. Since the injection of alcohol around the nerve accomplishes, either, the chemical section of the nerve, or, the obliteration of a perineural focus of bacteria (since the action of the alcohol is quite local), or both, and also since neuralgia has been relieved by the injection of alcohol about the nerve and nerve function has returned without the return of neuralgia, the alcohol must have obliterated a focus of bacteria. If alcohol used this way

will obliterate a focus of bacteria about a nerve, why will it not obliterate a focus of bacteria interstitially in the cervix and why not a focus of bacteria in any part of the body within the reach of its use? Results alone will answer this question. I will leave the subject here and pass to the discussion of endocervicitis.

#### THE NORMAL GENITAL TRACT

Barbour<sup>20</sup> says "In striking contrast to what we should anticipate is the now well-established fact that the normal genital tract is, above the os externum, germ-free." Proof of this could only be got by examination of the parts removed by abdominal section; and we had to wait for Winter's<sup>21</sup> systematic examination of fallopian tubes and uteri obtained in this way for the demonstration of this, the most remarkable fact in bacteriology applied to gynecology. Winter placed the boundary between the germ-free and the germ-containing portions of the genital tract at the os internum, but the more recent investigations of Stroganoff,<sup>22</sup> Menge,<sup>23</sup> and Walthard,<sup>24</sup> show that it is lower down in the region of the os externum.

When we ask the reason of this remarkable phenomenon we find the answer in the conditions to which microorganisms introduced into the genital tract are subjected. The secretion present in the healthy vagina has been shown by Döderlein,<sup>25</sup> Menge, Krönig and others to have a germicidal action. Pure cultures of pathogenic organisms, for example streptococci and staphylococci, introduced into the healthy vagina are destroyed in a few hours. The mucus secreted by a healthy cervix has a similar action. Thus, the uterus, which would otherwise be the best incubator for microorganisms, is barred to their entrance, the bacteriologic gate of the genital tract being not at the vaginal orifice, but the os externum.

#### PREDISPOSING CAUSES

Curtis<sup>26</sup> says "Certain conditions predispose to leucorrheal discharges. Important among these are lacerations and displacements, changes in the cervix which cause increased mucous secretion, infections complicating pregnancy, and gonorrhea."

#### ETIOLOGY AND BACTERIOLOGY

(a) *Contribution of the Uterus.*—Schwarz and Kohlburg<sup>27</sup> examined 305 cases of which 70 showed interstitial endometritis. Usually small round cells were present in large numbers and when appearing alone they are found in considerable quantities penetrating the upper half of the endometrium and are grouped around the glands. Strong<sup>28</sup> concluded after examining many curettings in six years from all types of conditions, that the uterine mucosa was very resistant to pathological change. Strong says, "the characteristic cell of chronic inflammation,

is the lymphocyte and the tissue reaction is that of scar formation, the production of fibroblasts and the deposition of elastic fibrils. These distinctions are not marked in the endometrium, where lymphocytes are present to some degree in all stages, and the fibroblastic change may be seen in many cases of endometritis postabortum, which certainly cannot be called chronic. \* \* \* Where there are definite collections of pus cells or round cells, inflammation may be determined, and hemorrhage, fibrin and necrosis, or a granulation membrane, are the outspoken marks of intensity." Curtis found no bacteria in uterine scrapings, negative cultures from the endometrium and no leucorrhœal discharge from the uterus. Menge and Krönig<sup>29</sup> were led to conclude after examining material aspirated from the cervix and the uterus that bacteria did not live in the uterine cavity.

(b) *Contribution of the Vagina.*—Döderlein found a vaginal bacillus, nonmotile, nonpathogenic, anaerobic, facultative aerobic, which forms drop-like colonies on glucose agar. Menge and Krönig found the majority of bacteria in vaginal secretion to be anaerobes, some of which grow on acid media as facultative aerobes. Wegelius<sup>30</sup> studied the bacteriology of postpartum discharges giving a classification of bacteria, and Heurlin<sup>31</sup> classified bacteria in puerperal cases. Curtis studied 75 cases of which 35 had profuse leucorrhœa. Firstly, the cultures were taken from the vicinity of the cervix. He found the uncontaminated vaginal secretion to contain a preponderance of the large Gram-positive vaginal bacillus of Döderlein. Purulent discharges showed great variations in the flora and gave difficulty in classifying the bacteria. Secondly, cultures from the vulvar region contain more aerobes, such as bacillus coli, staphylococci and pseudodiphtheria bacilli. Patients subjected to frequent douching showed high vaginal cultures contaminated by aerobic organisms. About fifteen varieties of bacteria were isolated, the majority of which were anaerobic. To test the toxicity of the secretions and the virulence of the organisms, animals were given subcutaneous, intravenous and peritoneal injections with vaginal washings from four pronounced cases of leucorrhœa, but nothing noteworthy of toxicity was found. Curtis says, "The rôle of the gonococcus deserves careful consideration. Gonorrheal infection is the exciting cause of leucorrhœa in the vast majority of women who have never been married. After creating conditions favorable for the development of other organisms, which are accompanied by profuse purulent discharge, in an astonishingly large percentage of cases, the gonococcus so completely disappears that it is not demonstrable through any means at our command. This suggests that a chief part played by the gonococcus in chronic leucorrhœa consists in preparing the soil for the leucorrhœa-producing organisms. \* \* \* Gram-positive diplococci are always present in vaginal smears. Often they are found in considerable numbers but are not found in groups or chains. Streptococci are infrequent in fresh preparations, but readily



develop from diplococci on artificial media. Staphylococci are found in the vaginal smears, but are notable chiefly for their moderate numbers." Crossen<sup>32</sup> says "Acute endocervicitis is due to infection with the gonococcus or with ordinary pus-germs. \* \* \* Some authorities hold that gonorrheal endocervicitis is usually the primary lesion and that the vagina is infected secondarily. \* \* \* In puerperal metritis (streptococci and staphylococci) the infection more often extends by way of the lymphatics directly through the wall of the uterus from the endometrium to the connective tissue around the uterus and to the peritoneum. \* \* \* Another avenue of entrance is through the thrombosed sinuses of the puerperal uterus. Infection of these sinuses leads to infective thrombosis of the broad ligament veins, resulting in broad ligament abscesses or general pyemia or both."

#### PATHOLOGY

*Erosion.*—Clinically the erosion presents somewhat the appearance of a granulating ulcer, but Ruge and Veit<sup>33</sup> showed the raw surface to be covered with epithelium and the granular points new formations which have no relation to the granulations of an ulcer. The surface is covered with a single layer of columnar epithelium and the cells are smaller than those which normally line the cervical canal. The surface is thrown into numerous folds producing glandular recesses and processes and if the ducts of the glandular recesses become occluded we have retention cysts. These may come to the surface and burst presenting a follicular erosion. The origin of this new epithelium in erosion is disputed, Ruge and Veit holding that the single layer of small cylindrical cells is produced by proliferation of the deepest layer of the rete Malpighii while those of the deeper layer are shelled off. Barbour says "Those red patches are generally continuous with mucous membrane of the cervical canal and resemble it in their microscopic structure." Fischel<sup>34</sup> holds that there is a proliferation of both the epithelial and connective tissue cells and also a persistence of the cylindrical epithelium (found outside the os externum in the fetus) into adult life. However, whatever may be the origin of the columnar cells in erosion, we find that nature has provided a much greater excreting surface to eliminate the underlying irritant by introducing numerous new processes and recesses and lining them with smaller columnar cells.

*Interstitial Round-cell Infiltration.*—What becomes of the infective thrombi (described by Crossen) after the acute puerperal fever subsides? Are they completely removed by the blood corpuscles and the lymphatics, and the bacteria destroyed, or, do living bacteria persist in the areas of round-cell infiltration (described by Sturmdorf<sup>35</sup> as miliary abscesses) about the glands of, and interstitially in the cervix and even in the connective tissue of the broad ligaments. Adami<sup>36</sup> very clearly describes the relation of the tissue cells and the microorganisms in acute inflammation,

then sums up Hohnfeldt's<sup>27</sup> observation on the processes occurring in a suppurative inflammation that ends in healing, the last being "eventual proliferation of the connective tissue at the periphery of the abscess; formation of fibroblasts in the highly vascular surrounding zone; absorption, cicatrization, and encapsulation of the debris of the leucocytes and micrococci." He did not state whether the micrococci remaining were living or dead. The literature reviewed did not answer this question and it is doubtless due to the difficulty in demonstrating bacteria in round-cell infiltrations of such small volume. Further Adami says "Where the irritant can be conveyed to the exterior an abundant exudative inflammation generally occurs—an abundant flushing;" [Leucorrhea in endocervicitis—note by author]. Adami continuing, says, "where it can be conveyed into one of the body cavities, the same holds good; but here a mechanism is often called into action whereby the exudate with its contained irritants is held within the serous cavity for days and weeks after all signs of active inflammation have subsided. The organism, that is to say, would seem to restrain its drainage to the general lymphatic system;" [pelvic exudate in acute salpingitis or acute puerperal fever—note by author]. Continuing, "Where the irritant is merely the product of tissue change, the profuse exudate is rapidly conveyed away; where, on the other hand, the injury is of bacterial origin, the passage of lymph from the focus of inflammation, is, generally speaking, not nearly so free; it is of thicker consistency and drains away slowly." Accordingly where there is leucorrhea there must be an interstitial irritant, the most probable being the toxin produced by bacteria in the foci of round-cell infiltration. This toxin acts upon, first, the adjacent glands causing them to hypersecrete, and second,—the nerve elements (principally the sympathetic) irritating them to reflexly produce the pain, backache, and general malaise accompanying endocervicitis.

#### TREATMENT AND RESULTS

Four methods of treatment present themselves;

##### 1. Establishment of free drainage by the systemic lymph channels.

The more attention is paid to this method of treatment the less will be the necessity of the other three. Constipation being the greatest obstacle to success here, one finds that two grains of calomel with soda bicarbonate at bed time, followed by a saline cathartic in the morning, and repeated about every three weeks accomplishes the best results. Some form of laxative should be given regularly and every means should be used to improve the general health.

##### 2. Establishment of free drainage by exciting a flow of lymph toward the cervical canal or drying up the discharge.

Since the lymph flows opposite to its natural direction less results might be expected from this form of treatment, but on the contrary, these treatments have been and are being used constantly and give

temporary relief from the symptoms. Experimentally it has been shown that seven to eight times as much material may drain away from an inflamed as from an uninflamed area (Samuel)<sup>38</sup>. Adami says, "there may be great exudation under two apparently opposed conditions; in the presence of comparatively mild physical irritants, and in that of severe bacterial irritants. In the former case it more especially subserves removal, in the latter, dilution of the poison." This method offers the greatest variety of therapeutic measures.

(a) Cauterization seems to be universally used in cases of erosion and while different substances accomplish almost the same results, silver nitrate in 5 per cent to 40 per cent solutions seems to be the most convenient and satisfactory.

(b) Tampons of glucose 50 per cent, or glycerin, or ichthyol 10 per cent in glycerin have been used, frequently as a placebo but even as such the patient says "the treatment gave considerable relief." Curtis, however, believes that both the tampon and the douche are harmful.

(c) Douches. Curtis observes that "douches seem to scatter bacteria and fail to remove the source of infection." Perhaps in the very early stage omission would be the better course, but later the cleansing and heat of the douche make for comfort. Douches of lysol of a strength of 1-500, or potassium permanganate, 1-6000, will suppress any disagreeable odor.

(d) Powders. Drueck<sup>39</sup> suggests the use of borophene powder. Curtis uses powders and claims this dry method to be the best treatment and lasts for a considerable time, but that later there is a tendency to recurrence. The action of the powder he believes is absorptive and not medicinal.

(e) Paste. Hollender and Grattiot<sup>40</sup> report the introduction of one dram of Beck's bismuth paste into the canal of the cervix two to four times a week. Of 21 cases treated, 17 were discharged cured, observation being made over a period of six months.

(f) Dilatation of the cervical canal without curettage would permit free drainage of the cervical glands. Rawls<sup>41</sup> has shown that curettage has a very limited scope and in the light of the etiology there seems scarcely a place for its use.

### 3. Inhibition of the activity of the foci of round-cell infiltration.

*Vaccines.*—Curtis has used this form of treatment in cases with free discharge. Vaccines were made from selected anaerobic cultures and seemed to give the best results. Many patients apparently cured suffered relapse at a later date. Courses of vaccine, after other things had failed, resulted in complete cessation of leucorrhea for two months. These vaccines have given relief from backache, and general malaise in almost every case. Since Curtis found nothing noteworthy of the toxicity in animal experiments, one would expect the absorption of these toxins by the patient would produce milder symptoms than are experi-



enced, unless the toxins were active only upon human beings. Since autogenous vaccines gave the most satisfactory results, one would be led to suppose that there are similar organisms to those from which the vaccines were made, in the interstitial foci in the cervix.

4. Obliteration of the foci of round-cell infiltration. Success can only be expected in proportion to the number of these foci destroyed. Trachelorrhaphy as done by Emmet<sup>42</sup> and since modified by Dührssen<sup>43</sup> is of comparatively little value when the infection is extensive. Schroeder's<sup>44</sup> operation for the excision of the cervical mucous membrane [of which the tracheloplasty of Sturmdorf seems a modification] may in some cases remove all the foci, but in others is of no great value. Koster<sup>45</sup> says "in undoubted cases of chronic endocervicitis, after removing a cone-shaped wedge containing the endocervical mucosa, after the technic of Sturmdorf, a piece of tissue from the new canal wall was excised before relining with the mobilized vaginal cuff. This upon section and staining showed glandular elements and surrounding inflammatory reaction similar to the tissue removed in the cone-shaped wedge." Koster, following up the results of tracheloplasty finds that many cases followed after operation continued to have symptoms referable to the continued presence of chronic endocervicitis, and that the tendency toward the cure of chronic endocervicitis is directly proportional to the approach of an amputation. Marekwald's<sup>46</sup> wedge-shaped excision of each lip of the cervix removes much interstitial and glandular tissue of the cervix and is accompanied by less danger of postoperative hemorrhage than either tracheloplasty or amputation. Amputation as done by Hegar<sup>47</sup> removes much of both the interstitial and glandular tissue, but should only be done in selective cases. Koster says, "The operation of amputation of the cervix has been discarded because it is frequently followed by serious hemorrhage, because preexisting menorrhagia or dysmenorrhea is often intensified, because sterility may be produced in a considerable percentage of cases which might otherwise become pregnant, because premature labor may be brought about in cases which do become pregnant after amputation, and because cervical dystocia is produced in many patients coming to full term."

Since some cases, after all the above methods have been tried, continued to have symptoms of endocervicitis, we look for the explanation here, that, without the obliteration of all foci of round-cell infiltration, the real cause of endocervicitis cannot be removed. The toxin from many foci of bacteria will produce the general symptoms without necessarily an accompanying leucorrhea; but this leucorrhea frequently may develop later. In Emmet's and Dührssen's operations neither all the glands nor all the interstitial foci have been removed. In Schroeder's and Sturmdorf's operations, principally only those foci between the cervical glands have been removed. Marekwald's and Hegar's procedures remove the greatest number of foci. In all cases where the flap of vaginal mu-

cous membrane is invaginated to form a new lining for the cervical canal, the remaining foci have for the nearest outlets of their irritant toxins, the glands of the uterus near the internal os, which, being stimulated to secrete, produce a leucorrhea. It is with the aim of destroying these foci that the author has decided to use the interstitial injection of alcohol.

The author has used ethyl alcohol injected hypodermically in some minor infections of the extremities with excellent results. Two cases of mastitis each received a single injection before 36 hours after the onset, with the result that all symptoms passed within three days, and that no interference in lactation was observed. Four cases<sup>48</sup> of chronic prostatitis, three cases of acute epididymitis, and nine cases of chronic epididymitis each received a single injection of one-half to two c.c. 25 per cent ethyl alcohol, which resulted in the disappearance of all signs and symptoms in from two to ten days; no second injections were required and no symptoms recurred in the periods of observation ranging from three to twenty weeks. No tuberculous and no primary syphilitic lesions were treated. Where possible, nitrous oxide and oxygen should be used, as the pain is similar to the sting of the bee and lasts for about one minute after which there is anesthesia. The cervix being less sensitive, an anesthetic is not required.

The author wishes to make a preliminary report of the use of alcohol interstitially in endocervicitis and to illustrate with five cases. More cases are under observation and while no conclusions will be given with this report the author feels sufficiently encouraged to continue its use and make a further report at a later date.

#### METHOD OF TREATMENT

After drying the cervix and applying tr. iodine to the vaginal portion, the cervix is grasped with a double tenaculum and from 1 to 2 c.c. of a 25 per cent solution of ethyl alcohol in distilled water is injected [with an ordinary hypodermic needle attached by an adapter about 8 cm. long to a record syringe] into the anterior and posterior lips of the cervix parallel to the canal, care being taken not to penetrate a gland and thus lose the solution in the canal, because it has no value unless it be placed interstitially.

#### CASE REPORTS

CASE 1.—J. R., 14835, O. P. D., age 26, para iv, one miscarriage at six weeks, twins born about Jan. 20, 1920. On March 4, 1920, patient applied for relief of vaginal discharge since confinement, losing strength and weight since confinement, pain in abdomen and back.

*Physical Findings.*—Lacerated pelvic floor, uterus enlarged, anterior and movable, appendages negative, lacerated cervix having on it an erosion about 3x1 cm.

*Treatment.*—Silver nitrate (10 per cent) applied to the erosion tampon, (10 per cent) ichthyol in glycerin and douches of bicarbonate of soda. March 11th, patient feels better. Part of the erosion on the posterior lip has disappeared. March 18

and 25, two treatments. April 1. Discharge still present, erosion shows no improvement since March 11. April 8. Discharge is slightly less, otherwise condition unchanged. Three treatments follow before next visit. May 20. One c.c. of 25 per cent ethyl alcohol injected interstitially into each of the anterior and posterior lips of the cervix. May 27. No discharge; much improved during the past week; erosion has been more than half covered with new epithelium which looks very healthy. The remainder of the erosion is less hyperemic. To return in three weeks. June 17. Did not feel well at last menstruation but much better now. No discharge, no pain, erosion unchanged. July 8. Condition same as at last examination. Sept. 23. Patient in excellent health, has had no pain and no discharge since last examination. Is now about  $3\frac{1}{2}$  months pregnant.

CASE 2.—C. B., 14527, O. P. D., age thirty-eight, menstruation normal except duration which is 8 days. Para iv, ages thirteen years to one year. Aug. 21, 1919, came for relief of (1) Bleeding since July 19, 1919.

*Physical Findings.*—(1) Uterus slightly enlarged. (2) Right appendage contains a large mass. Hospital History 23269—Chief Complaint—Metrorrhagia. *Hospital Diagnosis.*—Myoma Uteri. *Postoperative Diagnosis.*—Endometritis, postabortum Uterine Polyp. Chronic Appendicitis. *Pathologic Diagnosis.*—Endometritis, postabortum, placental polyp, obliterated appendix. *Operation.*—Dilatation and curettage, supravaginal hysterectomy, left salpingo-oophorectomy, appendectomy. *Convalescence.*—Uneventful. *Important Points.*—General condition excellent. Abdominal scar normal. Slight induration in left adnexa not tender.

*Follow-Up Examination.*—10/13/19. General condition excellent. No complaints. Abdominal scar normal. Cervical stump up in normal position and there is no induration or tenderness about it. Advised to return in three months. 11/6/19. Reported at conference.

*Out-Patient Examination.*—11/10/19. Some bleeding from the cervix, also tenderness in left adnexa points to some adhesions about the stump. Erosion cauterized with silver nitrate.

*Follow-Up Examination.*—1/12/20. General condition excellent. No symptoms until three weeks ago when the patient noticed spots of blood from the vagina every day. Examination shows no induration or tenderness in the pelvis. Cervical stump feels normal but there is a marked cervical erosion which bleeds considerably upon touch. Erosion treated with strong silver nitrate solution and referred to O. P. D. for treatment and observation. To return in three months.

*Out-Patient Examination.*—1/19/20. No evidence of any adnexal disease. A very marked erosion is present. Smears taken were unsatisfactory, showed no intercellular elements present. Solution of silver nitrate was applied to the erosion and 1 c.c. of 25 per cent ethyl alcohol injected interstitially into each of the anterior and posterior lips of the cervix.

*Follow-Up Examination.*—4/12/20. Previous spotting stopped in January. General health excellent. No pelvic complaints. Abdominal scar normal but diastasis recti from pubis to three inches below umbilicus. Not a ventral hernia. Cervical stump remains high under straining. To return in three months, July 5, 1920. (Dr. Bullard.) 7/19/20. Symptoms of surgical menopause. No direct pelvic complaints. Conditions same as last examination. To return in six months—Jan. 17, 1921 (Dr. Bullard).

*Out-Patient Examination.*—9/20/20. Patient was sent for. Examination shows erosion very small and so evidence of any adnexal trouble. Patient has very slight discharge.

CASE 3.—B. G., 14793, O. P. D., age thirty-two; menstruation normal; para ii, ages



twelve and six; puerperiums normal. Jan. 29, 1920. Came for relief of (1) Leucorrhea, (2) Burning vulva, (3) Pain in back, abdomen and legs for 10 months.

*Physical Findings.*—(1) Appendages thickened, (2) Uterus retrocessed and to the right, enlarged, firm and movable, (3) Cervix—Bilateral laceration with an erosion about 2 cm. in diameter.

*Treatment.*—Silver nitrate (10 per cent) applied to the erosion, tampons and douches. February 2. Smears taken at first visit show no bacteria present. The erosion presents an appearance of a superimposed ulceration which seems to have produced a number of deep fissures in the posterior lip. *Treatment.*—One c.c. of 25 per cent ethyl alcohol injected interstitially into each of the anterior and posterior lips of the cervix. February 16: No improvement seen. February 26: Patient feels much better, has not had any pain but some backache which she attributes to working. The area described on the posterior lip no longer exists and the ulcerated area has granulated in with healthy tissue and is covered with epithelium which bleeds only with much rubbing. The congestion of the cervix has disappeared. September, 1920: Patient sent for but did not return.

CASE 4.—C. H., 14757, O. P. D., age forty-two; menstruation normal, para iii, seventeen to ten years. Normal puerperiums; one miscarriage—spontaneous—date not given.

January 8, 1920—Came for relief of (1) Pain in abdomen. (2) Flowing every morning. (3) White discharge with odor—duration six weeks.

*Physical Findings.*—(1) Uterus large. (2) Lacerated pelvic floor (slight). (3) Lacerated anterior wall (slight). (4) Irregular laceration of the cervix with an erosion on the anterior lip which bleeds easily.

*Treatment.*—Silver nitrate (10 per cent) applied to the erosion, tampons and douches. Jan. 11. Cervix congested, painted with iodine; silver nitrate (10 per cent) applied to the erosion and 1 c.c. of 25 per cent of ethyl alcohol injected interstitially into each of the anterior and posterior lips of the cervix. Jan. 22. Considerably improved. Erosion on lip almost gone; no discharge. Jan. 29. Discharge has ceased. Has had some headache during the past week. Only douches now and again. External os red. Cervix soft. February 26. No symptoms, no discharge. Cervix has a few small superficial cysts where the erosion was originally. June 10. Condition same as at last visit. Has had no trouble since. Sept. 16. Patient feels well and has no symptoms except a very slight mucus discharge in the morning. Does not require douche, or wear a napkin. Erosion negative and examination same as on visit of Feb. 26.

CASE 5.—A. J., 14710, O. P. D., age thirty, menstruation regular; para ii, ages ten and seven; normal puerperium. No miscarriages.

Nov. 24, 1919—Came for the relief of (1) Pain in the pelvis which confined patient to bed for last two months. (2) Metrorrhagia, bleeding twice a month for last three months. (3) Leucorrhea.

*Physical Findings.*—(1) Uterus forward, small mass about 0.5 cm. in diameter on the anterior wall near the internal os. (2) Appendages slightly thickened. (3) Cervix inflamed with some erosion.

*Treatment.*—Iodine applied to the cervix, tampons, and douches. December 1. Improved. Silver nitrate (10 per cent) to the cervix, tampons and douches. December 8. Iodine to the cervix and 1 c.c. of ethyl alcohol (25 per cent) injected interstitially into each of the anterior and posterior lips of the cervix. December 22. Patient feels much better but has had two menstruations this month. Cervix is much improved and the erosion has almost disappeared. January 5. Patient says she feels well; no erosion on the cervix. January 10. Discharged until patient

feels she needs more treatment. Sept. 27. Patient sent for—has been in excellent health and no symptoms. Does not use any douches. Erosion has not reappeared. Uterus forward and apparently normal. Appendages negative.

NOTE: The author acknowledges his indebtedness and expresses his thanks to Dr. F. N. G. Starr of Toronto for the suggestion of the use of ethyl alcohol in infections, believing that its use originated with him. Dr. Starr writes: "Its effect in clearing up a mild endocervicitis is marvellous, as also in many infections of the arm and leg."

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## CHOREA GRAVIDARUM\*

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THE disease known as chorea gravidarum is rare; however it occurs more frequently than is generally thought. Williams<sup>1</sup> states that he has seen only one case of the grave variety, and that patient died despite early spontaneous premature labor. The comparatively little attention given this subject in American literature induces me to submit the reports of six cases, in the hope that they may be of some aid in the further study of a disease, with which we are as yet none too familiar.

While mentioned as early as 1594 by Schenklius,<sup>2</sup> and described in 1660 by Horstius,<sup>3</sup> it seemed to excite little more than passing interest until about the middle of the last century. We are told by Bumm,<sup>3</sup> and Meyer<sup>4</sup> that almost 10 per cent of all psychoses in women originate in the predisposing factors of toxemia, hemorrhage, infection, and lactation; however, a better obstetrical hygiene and management have reduced this to 4 or 5 per cent, and at the present time encourages the hope for further improvement along these lines. Kleist<sup>5</sup> reported from the neurological clinic in Halle 39 cases of chorea gravidarum among a total of 155 cases of chorea affecting both sexes. Muehlbaum<sup>6</sup> reported that among 65 females with chorea, between the ages of 16 and 30 years, 27.7 per cent had chorea gravidarum; Bonhoeffer<sup>7</sup> contends that more than half of the cases of chorea gravidarum are recurrences of chorea which had existed before the onset of pregnancy. Many text-books and writers on the subject claim that heredity plays a part in the causation of the disease; Wollenberg<sup>8</sup> found among 539 cases of chorea minor, only 2 per cent of the parents had had chorea, and 1.5 per cent affected the mothers. Buist<sup>9</sup> reported among 203 cases that the onset of the disease occurred 108 times during the first 3 months; 70 times during the second 3 months; 25 times during the last 3 months, and 16 times postpartum.

The etiology of chorea gravidarum is unknown. French and Hicks<sup>10</sup> reported 29 consecutive cases treated in Guy's Hospital during the preceding thirty years; 19 of these patients had had rheumatism or chorea previously, and of these, 15 had had chorea before marriage; hence these writers feel convinced that chorea gravidarum and infantile chorea possess a similar pathology and have a tendency to recur in subsequent pregnancies. Buist's figures show that among 226 patients there were 66 with previous attacks of chorea, and 25 more gave his-

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tories of attacks of acute rheumatism without chorea, while 20 additional patients gave histories of attacks of acute rheumatism and chorea. Wall and Andrews<sup>11</sup> reported a history of previous chorea in 16 out of 37 cases with chorea gravidarum. Other investigators as Quigley,<sup>12</sup> Graves and Paige,<sup>13</sup> and Mackey<sup>15</sup> argue that the disease is of infectious origin. Birnbaum<sup>23</sup> reports that bacteria, mostly streptococci, as well as small cerebral emboli from endocarditic processes, are often found in the brain, a view with which many other investigators agree. Duckworth<sup>16</sup> emphasizes a rheumatic source or origin of the disease and contends that many instances of rheumatic conditions of lesser degree with endocardial involvement escape recognition because of the absence of much pain or fever; most of the cases of rheumatism reported being of the severe type. He agrees with Poynton, Payne, and Sanger, whom he quotes, that the only question now remaining to be settled is what variety of streptococcus causes the disease.

Sanger<sup>17</sup> submits as evidence of the uterine origin of the disease the fact that convulsions, twitchings, etc., disappear almost without exception after the uterus is emptied, and he states further that only 7 cases are on record where chorea extended beyond the puerperium. W. F. Shaw<sup>18</sup> considers the disease toxemic in origin and reported the treatment of 32 consecutive cases by rest and elimination, without the induction of labor and without a death; however, a study of Shaw's cases seems to indicate that they were of a relatively mild type. Hirschl<sup>19</sup> states that most instances of chorea in obstetrical practice are cases of Sydenham's chorea, or chorea minor, and are apparently due to toxins in the circulation, either in increased amount, or an increased harmful action upon the nervous system, such a condition causing chorea gravidarum or a marked predisposition toward it and suggests the possibility of a fetal source of the disease. He reports that autopsy findings often show small cerebral hemorrhages and vascular emboli, with subsequent inflammatory involvement of the vessel coats, originating in endocarditic processes.

Harding<sup>20</sup> suggests that because of the rapid improvement occurring in some cases of chorea gravidarum after emptying the uterus, the etiological factor must be a toxin arising from a lack of compensatory balance of the internal secretions and a consequent disturbance of metabolism during pregnancy. The same writer agrees with Oppenheim whom he quotes as stating that the above-mentioned factors plus the emotional tendencies of the pregnant woman explain why chorea gravidarum is so much more inclined to become chorea insaniens.

The prognosis of the disease is very variable; for instance, the prognosis of pregnancy in a choreic individual is usually unimportant, while a chorea appearing for the first time only after conception is always of serious import and the failure to differentiate these two conditions probably explains the marked variations in mortality figures: French and

Hicks 10 per cent; Buist 17.6 per cent; Schrock<sup>21</sup> 22 per cent; Fehling<sup>22</sup> 36 per cent; Birnbaum<sup>23</sup> 17.5 to 32 per cent.

French and Hicks consider the presence of fever to be very significant, a view not given so much importance by others. Among their 26 cases that recovered, not one had a temperature above 99, whereas in all (3) of their fatal cases there was marked pyrexia. They consider that pregnancy would justify a grave prognosis, if no obvious acute tonsillitis or other such cause for pyrexia can be found. They consider the prognosis good as long as there is no fever, regardless of choreic movements. They also feel that in a chorea gravidarum of several weeks' standing, when psychoses appear simulating delirium, especially hallucinations of vision or perhaps melancholia with increased anxiety or fever, very seldom stupor, that recovery is the rule unless exhaustion or acute delirium cause death. Birnbaum states that the temperature is usually normal except in endocarditis, pneumonia, sepsis, and abscess; also in severe psychic disturbances, as acute mania, etc., fever occurring shortly before death; the fever is of central origin, from damaged heat centers. He believes with Fellner,<sup>24</sup> that if, after a varying length of time, delirium suddenly appears with great mental disturbance, refusal or inability to take nourishment and great motor unrest plus increased temperature (fever), etc., that death usually occurs within one to three weeks. Hirschl believes that if the first week of the disease is passed satisfactorily, the greatest danger is over. A. Martin<sup>25</sup> is of the opinion that recurrences are very prone to take place during pregnancy; he also believes that the danger to life from chorea is usually from a severe endocarditis, meningitis, or similar complication. Schrock agrees with Hirschl that the nearer the end of pregnancy, the more favorable the prognosis. Spiegelberg<sup>26</sup> contends that less than one-half of the cases go to the end of normal pregnancy. He places the maternal mortality at 26.9 per cent, which is increased if complications are present. Muehlbaum considers one of the most significant signs of a bad prognosis to be the predominance of psychic over motor delirious symptoms in the beginning of the disease. He believes that the only favorable prognosis is in those cases that have had chorea in childhood; also that a gradual onset and a good physical condition together lend a more favorable outlook; and that recurrent choreas in subsequent pregnancies add to the gravity of the disease.

The opinions as to the treatment of chorea gravidarum vary. Such British investigators as Wall and Andrews, Shaw, Croft,<sup>27</sup> and others, argue in favor of the medicinal treatment and against the induction of labor. LePage,<sup>28</sup> after reporting abstracts of 20 fatal cases of chorea gravidarum where labor was not induced, concludes that it is safer to treat such cases by the early induction of labor; where induction is delayed, the results are very bad. He also concludes that anesthetics are badly tolerated in these cases. French and Hicks advocate the medicinal treatment, as in the nonpregnant cases. They believe that if labor is to be

induced at all, it should be done before the onset of fever, which, they feel, cannot be anticipated in enough cases to warrant induction before pyrexia begins, after which it is too late.

Bonhoeffer takes the view that over half the instances of chorea gravidarum are recurrences of chorea of childhood and are harmless; but that a first attack of chorea during pregnancy, accompanied by marked motor disturbances, forms an indication for the interruption of pregnancy. He emphasizes the danger of septic endometritis and septic endocarditis following infections of skin abrasions caused by the "motor unrest." Hel-lier<sup>29</sup> strongly advises terminating pregnancy in severe cases and expects improvement after two or three days following delivery. His views are thus stated: "When movements are slight; when the patient can eat and sleep well and maintain her weight; when the pulse is under 100 and there is no fever, or when confinement to bed suffices to keep the patient fairly quiet and comfortable, then there are no indications for radical measures." He gives the following indications for terminating pregnancy: "When there are violent movements despite rest in bed and sedatives; when there is inability to sleep or eat enough, accompanied by loss of weight; when mental conditions are confused, and when there is a tendency to delirium, rise of temperature, and a dry tongue, *especially when the pulse rate is persistently above one hundred and becoming weaker and more rapid*, then the indications for the interruption of pregnancy are complete and absolute. However, waiting for all such absolute indications may be too long, and in attempting to save the fetus, both mother and fetus may be lost by the delay." Spiegelberg treats each patient individually and empties the uterus as soon as the patient begins losing ground, as is evidenced by exhaustion, loss of weight, sleep etc., and a temperature of 37.8° C. or more. Bumm's opinion is that one-third of all cases of chorea gravidarum are of the acute type, and since medicinal treatment in such severe cases has repeatedly resulted fatally, it is futile again to experience such bad results and postpone until too late the only life saving therapy,—emptying of the uterus. Bumm favors vaginal hysterotomy as a means of rapid emptying of the uterus, a view advocated by Martin and by Anton.<sup>30</sup> The case reports that follow are given in considerable detail direct from the hospital records in order that the various phases of the disease may be noted.

#### CASE REPORTS\*

CASE 1.—Ob. 1961, M. J. D., married, white, U. S., aged twenty years. Grav. i. Admitted to Barnes Hospital, February 21, 1918, in the middle of the last month of her pregnancy, complaining of fever and tender joints (right shoulder, left knee, and left wrist) for the past few days; visible evidence of acute inflammation (arthritis) present. Temperature 98; pulse 120; respiration 24. Patient could not talk very well; some choreiform movements and speech disturbance present.

She had been treated in the medical service, (medical history 1572) from October

\*From Washington University School of Medicine, Service of Professor Henry Schwarz.



15, 1915, to November 19, 1915, from which the following abstract is taken: *Chief complaint*.—Pain in right hip changing over into left side at times; difficulty in speech; nervous headaches confined to frontal and occipital regions.

*Family History*.—Father died at 36 of tuberculosis and alcoholism; family history is negative as to neurological conditions. *Past History*.—Always weakly; choreiform movements since infancy; "spasms" or attacks suggestive of epilepsy between the ages of 2 and 12; only one such attack since the age of 12. Had measles, pertussis, varicella in infancy; scarlatina in childhood was followed by defective hearing. Incoordinate jerking movements present during examination. *Examination*.—Tonsillitis, rheumatism, chorea, slight enlargement and overactive heart; aortic impure, all sounds accentuated; tonsils enlarged; Babinski (?). Temperature always normal. Cell count (spinal fluid) 1; Noguchi reaction negative; Rinné and Weber to right (Koetter); sensory negative. *Nose and Throat Examination*.—Chronic rhinitis; posterior ethmoid and sphenoid suppuration; bilateral chronic tonsillitis. Blood pressure 126-72; red cells 5,200,000; white cells 6,600; hb. 80 per cent. Wassermann negative. *Diagnosis*.—Pseudosclerosis. *Treatment*.—Out of doors as much as possible alternating with rest in bed; forced diet.

November 7, 1917. Patient admitted to out-patient obstetrical service for an apparently normal pregnancy of 23 weeks' gestation. Her menses began at 14; always fairly regular and of the 28-day type, duration 7 days, and profuse. Last menstruation May 30, 1917; fetal movements felt October 29, 1917. Aside from a moderate amount of nausea and vomiting, headaches and eye disturbances during the first three months of gestation, patient had felt very well. At the time of her first obstetrical consultation she complained of some itching and tingling about her nipples; slight edema of the feet; bowels fairly regular, though patient takes syrup of figs about once a week. Heart and lung examinations normal; pelvic examination and measurements present no abnormalities. Urine always negative. Blood pressure ranged from 100-63 to 122-78 from November 7, 1917, until she entered the hospital on February 21, 1918, complaining as she did when first seen. At this time she had a heart murmur. She was delivered at full term by low forceps, labor beginning spontaneously on March 2, 1918. There was a small tear 1 cm. long on the right side of the cervix, followed by a pelvic cellulitis of moderate extent in the base of the broad ligament of the same side. Temperature ranged from 97° to 102° from the fourth to the twenty-second of March, 1918, and the pulse ranged between 80 and 120. Wassermann blood test on March 7, was positive, 3 plus; Wassermann repeated March 14, negative; complement-fixation test March 7, negative. Patient left hospital against advice of physician on March 22, 1918; at this time she had a chronic endocarditic murmur and subinvolution.

CASE 2.—Ob. 2024, E. R. S., white, U. S., aged twenty years. Married two months. Admitted to Barnes Hospital on April 13, 1918, at 11:30 A.M., suffering with chorea gravidarum; symptoms severe for ten days before admission. Pulse 110; respiration 24. Patient was second child, born prematurely at seven months' gestation, weight 3½ pounds. Her mother was suffering with nervous prostration at the time the child was born. Labor normal. When patient was four months old, she was normal as to weight, development, etc. One paternal aunt was considered "erratic" from an injury at birth. She had measles and pertussis in childhood; no serious illnesses or operations. *Menses* began at thirteen; always regular; of the 28-day type, duration 3 to 4 days, no pain. *Date of last menstruation*, February 1, 1918. *Married* on February 15, 1918; no period since marriage at San Antonio where a sister and her baby were with the sister's husband, an aviator, who departed for France shortly after patient's marriage. Patient greatly excited and

worried over safety of brother-in-law. Patient's husband, too, was told that he might be called to France at any moment.

*History as Obtained from Husband.*—Patient had tonsillitis early in January, 1918. Attending physician advised tonsilleectomy, to be done later. Patient was well until the first week in February when, because of nervousness, she consulted a physician who diagnosed a tachycardia, probably due to expected wedding February 15, 1918. About one week before this, she complained of a sore right wrist, but did nothing for it. She was well on wedding trip except for an occasional soreness of shoulder and leg, thought to be rheumatism; this soon disappeared and patient seemed well until March 25, 1918, when she consulted another doctor who told her that she was pregnant. This information made her quite nervous and irritable. Patient was ordered to bed; but as there was a rapid increase in her nervousness and irritability, she was advised to return to her home in New York for a complete rest. About the second week in April she complained of her right wrist and a great deal of twitching of the right arm; warm applications soothed her. There was great difficulty in getting patient to take food except milk and orange juice. While at Kelly aviation field, she was greatly distressed regarding several fatal accidents which she had witnessed.

April 14, 1918. Delirium and movements very marked. 11:00 A.M. Curettage. Uterine cavity five inches in length. 8:00 P.M. Patient was very noisy and irrational; could recognize attending physicians and her mother, but could not be quieted; given 1.5 c.c. scopolamine; abundant fluids by mouth plus a nutrient enema of dextri-maltose 30, crepton 20 gm., water 200 gm. 8:45 P.M. Sleeping since 8:30 P.M., given scopolamine 1.5 (gr. 1/133), following which she had uninterrupted sleep until midnight, then 1 c.c. scopolamine; slept until 3:15 A.M., when 1 c.c. scopolamine was again given.

April 15, 1918, 5:15 A.M., 1.5 c.c. scopolamine plus a few drops of chloroform to quiet patient who then went to sleep after expelling nutrient enema and taking 200 c.c. milk by mouth. She had very marked choreiform movements of right arm; delusions; involuntary stools; her buttocks and sacrum were chafed because of movements about bed. 12:30 P.M. Worries about "These two women who have caused her so much trouble and who will die the same death she is now dying;" says she saw von Hindenburg standing outside her door disguised as a doctor. Patient placed under scopolamine, narcophine, or morphine seminarcois (usually 1 to 6 injections of scopolamine and 1/8 to 1/6 gr. morphine or 1/2 gr. narcophine) every night for ten successive nights, from April 14, 1918, until April 24, 1918. Patient was always more or less noisy and irrational when awake; thinks all women murderesses, and sees eels and snakes.

April 19th. Red cell count 4,480,000; white cells 14,200; hemoglobin 85 per cent. May 5. Red cell count 5,872,000; white cells 7,600; hemoglobin 80 per cent.

April 19. Differential count, polynuclears, 59 per cent; lymphocytes, 38 per cent; large mononuclears, 3 per cent. May 5. Differential count, polynuclears 69 per cent; lymphocytes 27 per cent; large mononuclears 2 per cent; eosinophiles 1 per cent. April 18, 1918. Blood culture (72 hours) negative. Systolic, endocarditic bruit, heard at base and at apex, transmitted to axilla. Spleen and liver negative. Given bromides, chloral, trional, etc., until May 4, 1918, when they were discontinued.

May 1. Still voids urine involuntarily; is noisy and boisterous. May 7. Condition unchanged, except for the cessation of choreiform movements two days ago. May 12. Visited by husband whom she did not recognize, though the day before she talked rationally for a time and then rambled on incoherently. General nutrition good; still on liquid diet, milk, soups, broth, chocolate, etc., plus dextrose 1 oz., trophonine 1 oz., water 4 oz., twice daily as an enema and normal saline 200 c.c. per rectum every four hours. May 22. For past few days becoming more rational; asks for

nightgown; does not soil bed as before; takes plenty of nourishment; becomes rather noisy at night and late in afternoon; moved from isolated quarters to regular room in private pavilion much to patient's delight. June 1. Steady improvement, though at times becomes very noisy and throws hair brush at nurse; sleeps well; takes daily tub baths. June 13. Mitral on systolic murmur, compensated. Discharge note: "Patient entered hospital suffering with chorea gravidarum and rather severe mental symptoms of right hemichorea; symptoms severe for ten days. Patient became disoriented and required at first a fair amount of sedative medication and restraint. About May 5, 1918, chorea had disappeared. May 22, 1918, mental symptoms improved. The improvement, mentally and physically, continued, so that now she is about normal. At times, patient is disoriented, not able to identify people and inclined to be silly. All this, however, is rapidly disappearing and patient was permitted to go home on June 17, 1918." September 15. Letters from patient's parents show that patient made a rapid and perfect recovery.

CASE 3.—Ob. 1179, M. W., white, aged twenty-five years. Married. Born in Germany. Gravida, i. Admitted to Barnes Hospital on May 25, 1915. Unable to talk intelligibly. *Family History*.—Negative. *Personal History*.—Severe sore throat three months ago. No history of rheumatism. Gynecologic operation for "turning of womb" one year ago, after which menses were regular. Married on December 7, 1914. Was perfectly well until one week before admission. Failed to menstruate when due and began worrying over the possibility of being pregnant. Four days before admission to hospital she began making purposeless movements and talking unintelligibly. At present she no longer recognizes her husband or friends. Patient much worried because husband is out of work. Seems obsessed with the idea that she will never recover; no attempts at violence; good sphincter control. *Status praesens*.—Hiccough; groaning; alternately laughing and crying; twitching of various muscles of the face and extremities; eyes continuously moving about; cannot answer questions intelligently; shows evidences of lack of concentration; movements seem choreic, though not typical; teeth defective; throat negative; temperature 100; pulse 108.

May 26, 1915. "Patient unoriented, confused, shows evidence of acute maniacal excitement; restraint necessary; marked choreiform movements; grimaces, gnashing of teeth, guttural sounds are constantly observed. Patient seems under control of self-accusation. Combination of choreiform movements with acute maniacal excitement makes the diagnosis, chorea insaniens, definite." [Schwab.] Question of pregnancy not determined; possibility of a streptococcus infection of the tonsil, or elsewhere suspected. Treatment: symptomatic, with as little restraint as possible.

May 27. Psychomotor restlessness is very marked, with definite choreiform movements; temperature suggests the possibility of an infection as the basis of chorea. Leucocyte count at 10:00 A.M. was 28,500; red cells 4,400,000; hemoglobin 70 per cent. *Differential Count*.—Polynuclears 66 per cent; mononuclears 16 per cent; transitionals and large mononuclears 14 per cent; eosinophiles 4 per cent; blood pressure 110-60. Temperature ranged from 100° to 102°; condition showed little change; still in restraining sheet; choreiform movements present in diaphragm and noticeable when patient attempts to speak; movements in general are wild and purposeless; mental attitude enormously depressed; patient thinks she is doomed to die as punishment for some wrong committed in connection with a doctor and midwife. Herpetic eruption about the face. There is an element of depressive insanity in addition to the chorea.

May 28. Cured; very small ovum and decidua removed; ether anesthesia; spinal fluid obtained. May 30. Patient worse; more restless; exhausted with move-



ments; cannot speak above a whisper; speech incoherent. June 4. Choreiform movements have ceased; patient more or less quiet and motionless; great depression; general apathy; speech unintelligible. June 14. More rational for past three to four days; appears to notice surroundings; eats better. Fowler's solution, 5 minims three times daily. June 28. Improving slowly; Fowler's solution stopped and elixir of iron, quinine and strychnine substituted; at times, patient fairly quiet; looks brighter. July 4. Choreiform movements practically gone; patient quiet; shows no interest in surroundings; answers questions slowly, but with difficulty. Marked depression noticeable; no excitement. July 5. No traces of choreiform movements to be observed; patient restless but shows some psychomotor symptoms; intelligence much improved; questions answered promptly and accurately. Patient appears to be willing to talk about herself and her future plans. It is evident that the paranoid delusions still persist and are influencing patient's train of thought at intervals. It is impossible to say just how strong they may be in influencing the future conduct of the patient, nor how much they may be capable of being suppressed. The duration of the delusions is also a matter of doubt, because they may have existed long before the present illness. Patient could be sent home and allowed to come to the Out-Patient Department, Neurological Clinic, for future study. July 11. Mind clearing up; is quite rational; only a slight nervousness present; pelvic findings are normal. Patient is discharged improved. *Diagnosis*.—Toxemia of pregnancy; chorea. *Treatment*.—Induction of abortion, curettage; morphine, hyoscine, iron, arsenic, forced feeding, etc. *Note*.—Husband informed me that patient gave birth to a full-term child 15 months after her discharge from the hospital. She had a perfectly normal pregnancy, labor, and puerperium, and there was no sign of any recurrence of her former condition. At the time this information was obtained, the baby was about three months old and the mother was in excellent mental condition.

CASE 4.—Med. No. 6161. F. M. P.; white, U. S., married, aged twenty-one; grav. ii. Admitted to Barnes Hospital October 8, 1919; suffers from a "nervous breakdown." *Family History*.—Negative. *Personal History*.—Measles, varicella, and mumps in childhood; no sequelæ or complications; scarlatina, six months ago, following which there is a history of present trouble. *Menstrual History*.—Indefinite and not recorded. Married two and one-half years; 1 full-term normal pregnancy, healthy child; no abortions.

*Present Illness*.—Began some six months ago, following a mild (?) attack of scarlatina of two weeks' duration; after this, patient complained of headaches, backaches, nausea, and occasional vomiting; these attacks lasting from two to three days and recurring at intervals of four or five days; no increase in urinary frequency. The present condition began two weeks before admission to hospital, when patient went to bed because of "nervous twitchings" beginning on the entire left side and extending to the right; severe backache; involuntary control over muscular movements; sphincter control is present; mind rational.

October 8, 1919, 3:30 A.M. Temperature 99.6°; pulse 90. No history of tonsil or joint involvement; answers questions rationally; has continuous athetoid twisting movements involving arms, head, thumbs, and legs; no muscular twitching. There is a reddened pustular area, about the size of a 25 cent piece, on the right forearm. 12:00 noon. Entirely irrational; movements are thrashing in character; placed in a restraining jacket. October 9th. Patient in constant choreic movements of face and extremities; heart negative. Hyoscine hydrobromide, gr. 1/150 (hypo.); soft diet; sodium bromide, 30 gr. three times daily; morphine gr. 1/4 every three hours. 8:00 P.M. Temperature 108°; pulse 140; this was reduced by means of hydrotherapy; at

4 A.M., October 10, temperature was 97°; pulse 110. Soft diet discontinued, liquids substituted.

October 9, 10:30 A.M., hot pack in blankets; jacket removed. 2:30 P.M. Broke off needle in patient; general anesthetic given to remove same; 500 c.c. of 4 per cent glucose injected. 5:15 P.M. Kept in bath at 98° F. for one hour; always violent movements except for two or three minute pauses from exhaustion; four to five people always necessary to restrain patient. 7:00 P.M. Patient somewhat improved; apparently understands, but is unable to answer because of inability to control lips and tongue; morphine gr.  $\frac{1}{4}$ ; hyosine gr. 1/100 given. 7:30 P.M. Sleeping; rectal temperature 108°; given colonic flushing of tap water; floors and walls padded with mattresses and patient turned loose on floor with special nurse in room. 8:25 P.M. Rectal temperature 103°. 10:30 P.M. Absolutely quiet for past hour. 11:45 P.M. Patient awake and choreic movements recurring, though less violent; seems perfectly clear mentally and able to answer questions promptly.

October 10, 1919, 9:00 A.M. Mentally clear; pupils do not react to light; impossible to see eye grounds; blood pressure 70-55; condition seems choreic; ordered continuation of two hour feedings, especially milk, buttermilk, fruit juice, forced water; drip if necessary. 11:50 A.M. Complains of abdominal pain; patient claims that she miscarried and an examination of the bed pan disclosed a four months' fetus. An intact placenta was expressed without pain; no abnormal bleeding; all pain ceased with the expression of the placenta and patient promptly went to sleep. Routine postpartum care ordered. Patient slept most of the time for the next three to four hours, except when abrasions were rubbed with an ointment. When she was awake, mild choreiform movements were present.

October 11, 1919. Eyes look large; chalazion on one lid. Eye grounds negative; no further choreiform movements to any extent. October 15. Acne eruption. October 18. Ferric sulphate and quinine, each gr. 2, and calcium sulphate gr.  $\frac{1}{4}$  after meals. October 19. Unable to detect any further choreiform movements. October 26. Discharge Note: Upon admission, patient presented the hyperkinetic picture of a severe chorea; at times almost bordering on delirium. No treatment was particularly effective, although hyosine, morphine, hot packs, continuous hot baths, etc., were used, until the second day of residence in hospital when the spontaneous abortion of a four months' fetus occurred. From that time on, rapid improvement ensued. However, a pyogenic infection of the abraded skin of the right arm and shoulder necessitated a week's further treatment before complete recovery. Choreiform movements and acute maniacal state form the composite clinical picture presented by this case. The urinalyses were always negative except for a very few granular casts and a very faint trace of albumen on October 12, 1919. *Blood examination*, October 10: Red cells, 3,440,000; white cells 22,600; hemoglobin 80 per cent. October 13. White cells 23,600; October 14, white cells 15,400; October 15, white cells 14,400; October 19, white cells 16,600. Differential count, October 20: Large mononuclears and transitionals 8 per cent; lymphocytes 15 per cent; neutrophils 74 per cent; eosinophiles  $1\frac{1}{2}$  per cent; total cells counted 161.

Temperature, on admission October 8, 1919, 99.6° F.; pulse 90. 7:30 P.M. October 9: Temperature 108°; pulse 140; at 8:25 A.M., temperature 103°; 4:00 A.M., October 10, temperature 97°; pulse 110. After delivery, October 10; temperature was remittent, from 99 to 100.5° F. until October 15, after which it was intermittent from 97.6° F. to 100° F.; it was normal when patient was discharged October 26, 1919.

CASE 5.—Gyn. 1946, M. P. D.; white; single; U. S., aged twenty-one; clerk; grav. i. Applied at the surgical dispensary June 23, 1919, complaining of the presence of a

tumor of the "left side" for the past two months; no menses for four months. She gave a history of having had every Spring for the past four years, choreiform movements of the left hand, less so in the left leg; also that she would become "jerky," tongue felt heavy and she could not talk very well at such times. July 1, 1919. Referred to gynecological service of Barnes Hospital. Patient very nervous and restless. Temperature 99.5°; cries easily; does not want to remain in ward; she is frail and anemic; weighs 105 pounds; slight choreic movements limited to right side. *Personal History.*—Fell from top of a moving van when three or four years of age, and was unable to speak after this for more than one year. Four years ago she had an attack of chorea with fever and delirium; patient was in bed for four or five months, then recovered sufficiently to work. She was seen in the dispensary in July 1915, when she was unable to speak plainly and had slight choreiform movements of the right side; at this time she was treated with liq. potass. arsenitis for two months and, apparently, made a complete recovery. Patient worked as a clerk from that time until June 21, 1919. She had had several attacks of malaria; no history of rheumatism. *Menses* began at 11; regularly recurring every 28 days; duration three days; flow scant; pain before onset of flow, dating from nervous attack four years before; denies exposure to impregnation.

*Present Illness.*—Enters hospital because of tumor in abdomen, which she says moves. Patient admits exposure to impregnation and admits worrying over condition. *Physical Examination.*—Slight hypertrophy of right tonsil; slight adenoid mass; heart slightly enlarged, irregular, and rather rapid; slight roughened systolic second sound; right nephroptosis; fundus uteri extends 6½ cm. above symphysis. Temperature 99.5°. July 7. Refused noon meal; crying; complains of tongue being heavy and unable to swallow; examination reveals no visible abnormality; placed under observation. July 12. Diagnosis made of pregnancy and chorea. July 13. Blood pressure, 99-62.

July 22. Patient very noisy all day; crying and fits of wild excitement; ran down fire escape from third to first floor; claims someone shot her in the back and has been threatened. July 24. Restless; moaning; placed in restraining sheet; few minutes later, 11:50 P.M., a loud noise was heard in the corridor; patient had escaped from restraining sheet and was found hiding in a small closet; she resisted every effort to be put back to bed, crying: "Don't hurt me," and "Did you kill my mother." She was placed in a restraining sheet and given 1 c.c. of hyoscine hydrobromide solution (gr. 1/200). July 25. Patient totally disoriented; numerous hallucinations and delusions; seeing men at door and about room threatening her with firearms; also thinks they are trying to kill her mother; refers these delusions to various people working about her. *Diagnosis.*—Psychosis associated with chorea accentuated by pregnancy. *Prognosis* unfavorable as to life; may be improved if pregnancy is interrupted.

July 25. Left lids swollen from several large hordeola of upper lid; acute conjunctivitis of left eye; incision of hordeola recommended; frequent irrigations with boric acid solution, silvol in each eye every three hours. July 26th, 8:30 A.M. Intermittently rational and oriented. Two and one-half c.c. hyoscine hydrobromide given. At 10:30 A.M., a uterine bougie was inserted and the vagina packed with sterile gauze. 2:15 P.M. Awake, asking for doctor, mumbling and becoming loud of voice; given 1 c.c. of hyoscine. 5:30 P.M. Complaining of abdominal pain, irrational and violent most of time despite a total of 17 doses of hyoscine given between 2:15 P.M., July 26, and 12:00 noon, July 28. Uterine bougie removed; cervix admitting finger; this dilatation was increased by means of a Goodell dilator, membranes ruptured and uterine and vaginal gauze packs inserted. 1:30 P.M. Awake and crying with abdominal pain; 1 c.c. hyoscine solution. Strong uterine contractions. July 29, 1919,



9:00 A.M. Very restless and noisy; biting, kicking, jumped out of bed; put in straight jacket and given 1 c.c. hyoscine and morphine sulphate, gr.  $\frac{1}{4}$ . 11:20 A.M. Patient quiet; rectal temperature 105.2°; pack removed from vagina and uterus; os still shows only one finger dilatation; cervix partly obliterated. 650 c.c. urine removed by catheter. 12:35 P.M. Anesthetized; Bossi dilator used to dilate cervix to 6 cm., fetus extracted by breech and placenta partly expressed manually and the remnants completely detached with finger; cervical tear on left; 1 c.c. sterile ergot injected intramuscularly. 4:30 P.M. Temperature 106.8°; comatose; given digitalin gr. 1/30 every four hours; sponge bath reduced temperature to 105.2° at 6:00 P.M. 7:15 P.M. Acetone and diacetic acid found in urine; intravenous injection of 400 c.c. of 5 per cent soda bicarbonate solution, following which blood pressure was 78-48. 7:35 P.M. Systolic blood pressure 64; given camphorated oil m.xv intramuscularly. 9:15 P.M. Blood pressure 42-30. 10:15 P.M. Died.

Blood culture and Wassermann test were negative; urine always normal until July 28th, when  $\frac{1}{2}$  gram albumin per liter was found; acetone and diacetic acid were found on day of exitus. Blood count, July 13, red cells 3,288,000; white 9,000; hemoglobin 80 per cent. No autopsy was obtained.

CASE 6.—Ob. 1048. J. L.; white; aged twenty-five; married; U. S., housewife; gravida iv. Admitted to Washington University Hospital October 11, 1914, suffering with acute chorea gravidarum; pregnant 31 weeks. Patient gave a history of having been perfectly well until four weeks before admission when she complained of headaches and dizziness for about four days and then began to have irregular jerky movements of the left arm. These movements were not very marked, and did not give patient very much trouble. Two weeks before admission these symptoms became so severe that patient went to bed and, one week later, she was taken to the City Hospital, but remained there only three hours; insisted upon being removed immediately. Since then her condition had remained practically unchanged.

*Personal History.*—No rheumatism, tonsillitis, chorea, heart trouble, or serious illness of any kind. Patient had three normal full-term pregnancies and labors; she did not menstruate after first pregnancies until last child was born. All children living and healthy, ages five, three and one-half, and two years; puerpera uneventful; has been working hard at home. On admission she was having constant jerky irregular movements of the left side of face and left arm. Cheeks and chin were flushed. She was well oriented as to time and place; seemed rational and, except for an occasional incoherent remark, had no hallucinations or delusions; no loss of consciousness; speech was slightly halting; no tremors; good sphincter control; no history of attacks during her sleep.

*Physical Examination.*—Eyes react sluggishly; ears and nose negative; teeth fair, though considerably repaired; pharynx slightly congested; tongue deviated to right, moves irregularly, but has no tremor; heart negative, aside from a slight blowing systolic murmur, best heard in the second left intercostal space; lungs negative. The abdomen had no palpable viscera beyond a pregnant uterus of 31 weeks' gestation; fetal heart sounds heard in left lower quadrant, 150 per minute. Patient is of good muscular development; strength of both upper extremities equal; she is unable to control movements of left arm; surface temperature of latter slightly higher than on the right side; no adenopathy; reflexes well marked and equal on both sides; lower extremities negative, reflexes equal on both sides and quite distinct. Blood pressure 125-78.

October 13. Choreiform movements have increased in violence and distribution; patient throws herself from side to side; motor restlessness very marked; patient is delirious and has hallucinations; emotional state is variable with tendency to weep-

ing; illusions have reference to murder and destruction of her family; mental confusion is striking. Diagnosis: Toxic delirium incident to chorea of pregnancy. Patient put upon forced feeding. She was delivered at 1:25 P.M., October 13, by accouchement forcé. Child weighed 2290 grams and died three hours after delivery.

October 15. Patient seemed to become more quiet after labor: but at 1:00 A.M., the morning following delivery, she became very delirious and had to be placed in a restraining sheet; morphine sulphate gr.  $\frac{1}{4}$ , repeated after two hours, had little if any effect; she was then given morphine sulphate gr.  $\frac{1}{4}$  with hyoscine gr. 1/100 every three hours and remained quiet for a time. October 17. Patient's general condition seemed better, not moving her limbs so much as before; temperature 101.4° F.; corresponding pulse rate and of good volume. October 19th. Patient's condition seemed much improved, but later became very restless and required morphine and hyoscine. Herpes labialis for several days. Blood count: Red cells 4,728,000; white cells 15,880; hemoglobin 80 per cent.

October 21. Condition has become slowly worse; delirium very marked; jerks moderately in her sleep; temperature increased gradually from 102° F. to 107.6° F. at 10:00 A.M.; pulse 160. For past several days patient has had an eruption over the left hand, arm, and buttocks, consisting of superficial vesicles filled with a seropurulent material; left hand swollen and pitting on pressure, though no constriction of arm or injury found to account for it. The soft systolic murmur, found on admission, has changed to a louder to-and-fro sound. Patient was given 10 c.c. of antistreptococcic serum. Blood culture negative. Leucocyte count 21,560; hemoglobin 80 per cent. Patient remained comatose all day. October 21, 3:40 P.M. Rectal temperature 109.6°. She died at 4:32 P. M. Temperature (rectal) immediately after death 110.2°. Daily urinalysis showed moderate amount of albumin, no casts. No autopsy was obtained.

Of these six cases, ordinarily classed as chorea gravidarum, there seem to be two conditions included,—ordinary chorea minor and a chorea due to toxins incidental to pregnancy. There are instances of both conditions in this series.

Case 1 is doubtful. Since the diagnosis of pseudosclerosis had been made some years ago and since in this condition involuntary movements occur, it is possible that this case was not one of chorea, but rather pseudosclerosis. However, the condition seems to have been one of recurrent chorea which had existed intermittently since childhood, with a recurrent rheumatism, probably caused by a chronic tonsillitis and nasal sinusitis. The pregnancy was, probably, merely coincidental to the chorea, and the chronic endocarditis was one of the sequelæ often seen after nose and throat infections and after chorea.

Case 2 seems to have been a chorea of the doubtful class as to the toxicity of the condition; however, because the patient rapidly became worse after medicinal treatment, it was decided to empty the uterus before a possible fatal stage for this malady should be reached. The fact that it was necessary to keep the patient in a straight jacket for weeks, under more or less "twilight sleep," and supported mainly by means of rectal feedings, leaves little doubt as to the state of toxemia.

Case 3 had a preceding sore throat. This might have been a Sydenham's chorea, judging from a diagnosis made on the history of previous

diseases; however, the choreiform movements, plus the acute mania, and the observations of a careful observer, confirm the diagnosis of chorea insaniens.

Case 4 showed such rapid and striking improvement after the termination of the pregnancy, that it leaves little doubt that this was an instance of true chorea gravidarum.

Case 5 seemed at first to be a case of Sydenham's chorea that recurred during pregnancy, when the toxic element became more dominant. This case serves to emphasize the warning of Muehlbaum that recurrent chorea in a subsequent pregnancy renders the prognosis more grave.

Case 6 was a true chorea gravidarum occurring in the eighth month of an otherwise normal pregnancy. There was no history of any antecedent chorea or disease that might have caused the chorea. The history of three successive pregnancies, and more or less continuous lactations, might have been factors in lowering the resistance of the patient, and the nervous element, the result of her domestic difficulties, perhaps excited the acute attack. The temperature and heart findings suggest that the cause of death, eight days after delivery and after an apparent improvement, was probably endocarditis, though a blood culture failed to substantiate this.

All of these patients had an elevation of temperature ranging from 100° F. to 108° F., even those who recovered; while the elevations reached 108.8° and 109.6° F. in the two fatal cases. All had a rapid pulse, usually in the neighborhood of 110 to 120, and always out of proportion to the temperature. There was a definite history of mental anxiety and more or less nervous strain present in four of them; only one patient had a definite rheumatic history.

All patients were considered toxemic and so treated by emptying the uterus. The presence of fever, rapid pulse, choreic movements, more or less delirium, inability to take a sufficient amount of food, and the lack of improvement shown after medicinal treatment, all combined to fulfill the requirements set forth by Hellier as indications for an interruption of the pregnancy. Our practice has been to empty the uterus of all patients with chorea gravidarum where an acute onset first occurred during the pregnancy. Case 5, which resulted fatally, was an instance of Bumm's warning and was probably due to the fact that the case was considered a simple chorea of the recurrent type and the delay proved fatal. The other fatal case was also one in which considerable delay took place.

Among my six cases, there was no history of chorea in the family: the mother of Case 2 gave a history of having had an attack of nervous prostration. All six patients were between the ages of 20 and 25. The gestation periods at which the condition occurred were equally divided; two of them occurred during the first trimester, two during the second, and two during the third trimester of pregnancy.



Only one patient had had a definite attack of chorea previously, and this same individual was the only one who gave a positive history of rheumatism; a second patient, who had been thought to have had chorea before, was later diagnosticated as suffering with pseudosclerosis and might be classed as a doubtful recurrent chorea. Only one case was certainly recurrent, and this one resulted fatally.

#### CONCLUSIONS

From a consideration of these six cases and my review of the literature treating of chorea gravidarum, the following conclusions are reached:

Pregnancy in a choreic individual is not necessarily serious, though it may assume this character; however, an acute chorea beginning during pregnancy is always a grave affection.

A pulse rate persistently above 100 and the presence of fever, delirium, and an inability to take sufficient nourishment and rest, comprise a picture of the deepest gravity.

More attention should be given to guarding against predisposing factors. Among the needs in this connection may be mentioned the following: Proper diet, elimination, exercise without fatigue, adequate rest, and absolute freedom from extraneous worries and cares. During the puerperium, guarding against mental and physical exhaustion, improvement in nutrition and general physical condition, proper elimination, adequate rest, etc., are very important. The interests of the patient are best conserved by *early emptying* of the uterus as soon as a definite diagnosis of chorea is made. Pregnancy in the choreic individual should be treated symptomatically, and interference with gestation instituted only upon the appearance of symptoms conclusively pointing towards the severe form of chorea. Sterile blood cultures from three cases, two of which were fatal, and the rapid improvement shown after the termination of pregnancy, justify the belief that chorea gravidarum is of toxemic origin.

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WALL BUILDING.

## ENTWINING OF UMBILICAL CORDS IN SINGLE AMNION TWIN PREGNANCY\*

BY SAMUEL F. ABRAMS, B.S., M.D., ST. LOUIS, MO.

THE placenta of single ovum twins is usually made up of a single chorion, a double amnion and two umbilical cords. Occasionally, there have been described cases in which a single amnion was found in this type of placenta. In such cases there usually results an entwining of the two cords which leads, in most instances, to the death of one or both fetuses and also to miscarriage or to premature labor.

Williams states, in his textbook, that, in the rare instances in which single ovum twins are enclosed in a common amnion, their umbilical cords may become so twisted with one another and interfere with each other's circulation that the death of the fetuses and early termination of the pregnancy takes place. He mentions that Sonntag in 1905 collected 23 such cases from the literature. So far as I know, the publication of Sonntag is the most complete and also the most important publication in the literature concerning single amnions in twin pregnancy. In this article, Sonntag discusses the etiology of twin pregnancies as a whole and more particularly reviews the opinions as regards the origin of single amnions in single ovum twin pregnancies. He refers to the two theories, which are directly opposed to each other. According to the first, a double amnion is developed and as a result of a tear in the partition separating the two amniotic cavities, the cavities are united and the ruptured partition is subsequently absorbed.

\*Read before the Sixty-sixth Meeting of the Washington University Medical Society, March 8, 1920.

In the second theory it is suggested that, if two embryonal spots develop close to each other, it is possible that one amnion will enclose two fetuses. Sonntag quotes Bumm (1902) as an advocate of the latter theory. Sonntag also mentions B. S. Schultze as holding the same opinion. Schultze contends that the disappearance of the previously existing amniotic partition is unlikely.

Kleinwächter is quoted by Sonntag as stating that these cases primarily develop a double amnion, which, as pregnancy advances, becomes torn and as a resulting atrophy of the torn partition, a single amniotic cavity is established. Ahlfeld holds that it is possible that the amniotic partition which has been ruptured can be absorbed; but it must take place in a comparatively early stage of development, that is, when the amnion is still a fine, thin, and readily absorbable structure. This author also points out that in these cases the insertions of the cords are very close together, an observation which Zweifel and Bumm have also noted and which, the latter states, speaks for the development of only a single amnion.

Sonntag collected 23 cases of single amnion twins from the literature. There were two cases of living twins at full term. In one of these there was twisting of the cords, one about the other, and in the other only the formation of knots. There were five cases in which there was one living child at full term and in four of these cases there was knotting and entwining of the cords. The remaining cases were, for the most part miscarriages between the third and fourth months, and all showed both entwining and knotting of the cords with the exception of three, two of which showed only knotted cords, and in one only the cords entwined.

Jaschke in Liepman's *Handbuch der Frauenheilkunde*, (1914), mentions that the umbilical cords in single ovum twins can at times have the same placental insertion or even be definitely united to each other. In such cases the double amnion is almost totally destroyed, and the two cords are inserted very closely together. If one stretches these cord insertions, one can usually see the remnants of the former membrane between them. Such a case was very clearly observed by himself. I will show later that the case which I report, answers very closely to this description.

The specimen herein described (Fig. 1) was expelled from a uterus which apparently contained a pregnancy of about twenty-four weeks' duration. It consisted of a single ovum placenta, with two cords wrapped about each other several times, two fetuses, and a single amniotic cavity. The patient from whom the specimen was obtained gave the following history: She was thirty-eight years of age, pregnant for the fourth time, having previously given birth to three healthy children at full term with normal labors. Her last period was June 26, 1919. Examination on August 22nd revealed a uterus the size of an eight weeks' pregnancy. On September 25th, the uterus should have been the size of a twelve weeks' pregnancy, but the examination then showed the fundus at the umbilicus. Up to this time the patient



had not felt life, nor could the heart sounds be heard. She did not present herself again for examination until December 5. The uterus had not increased noticeably in size since the last examination. The patient had felt no fetal movements, nor could fetal heart sounds be elicited at the time of this examination. On December 9, the patient miscarried.

The specimen consisted of a single placenta to which were attached two cords. The placenta measured 10.5 by 11 cm. and was about 1 cm. thick. The membranes surrounding the periphery of the placenta were comparatively thick, retracted, and appeared edematous. The two cords varied greatly in size. The larger cord, was attached to a well developed but mummified normal fetus, 17.5 cm. in length. This cord, which was 25.5 cm. in length and 0.5 cm. in diameter, was attached centrally in the placenta. The smaller cord, about half the diameter of the larger cord, at its placental insertion, was 14 cm. long and gradually became thinner as it reached its attachment at the umbilicus of the smaller fetus.

At about 0.5 cm. from its attachment to the placenta the smaller cord divided into two branches. The smaller branch of the small cord was inserted into the

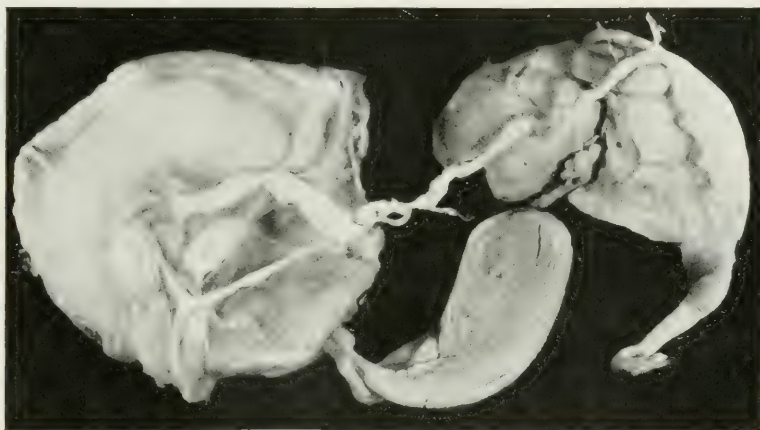


Fig. 1.

placenta about 1.5 cm. from the insertion of the larger and the larger branch of the small cord was inserted into the larger at the placental attachment of the latter. By pulling the smaller cord near its attachment a definite fold presented itself, which shut off a smaller cavity from the much larger amniotic cavity. Eight cm. from this placental extremity the smaller cord was wound around the larger cord for two complete turns. Immediately above these turns this cord was tied into one true knot and above this knot it was greatly twisted upon itself. It was broken off from the umbilicus of the smaller fetus at a distance of about 2 mm. from the umbilicus. At this point the cord was less than 1 mm. in diameter. The fetus which was attached to the smaller cord was 10.5 cm. long, and answered the description of a monster known as "acardiacus acephalus." This fetus presented two normal lower extremities, male genitalia, and trunk, and was without upper extremities and without a head. About 1.5 cm. from the attachment of the lower extremities the attachment of the umbilical cord could be seen; a piece of cord about 2 mm. in length and less than 1 mm. in diameter was attached here.

With the above clinical history and the description of the specimen, I believe that we are dealing with a case of single ovum twins with

a rather free anastomosis of the vessels leading to both cords. At a rather early period the stronger twin encroached upon the blood supply of the other to a very marked degree; resulting in the acardiac monstrosity, which represented the smaller fetus. Also as a result of the hypertrophy of the heart of the larger twin a hydramnios resulted which accounted for the large size of the pregnant uterus at the 16th week of pregnancy. Whether the twisting of the cords was an early process or not, one cannot definitely say. The length of the larger fetus would indicate that this had been growing normally until about the 4th month of pregnancy. Whether or not the amnion was torn through and the entwining of the cords took place after this time, I cannot positively say, but this seems quite likely. On the other hand, on account of the close association of the two cords the amniotic partition might have been only partially developed, and the twisting of the cords could date back earlier in the pregnancy, and by a rather gradual process, the smaller cord so constrict the larger cord that its blood supply would finally be cut off. In either event, this constriction of the larger cord on account of the size and development of the larger fetus, as above mentioned, could not have taken place before the sixteenth week of pregnancy.

417 WALL BUILDING.

## THE OVARY AFTER HYSTERECTOMY FOR FIBROIDS

(A FOLLOW-UP STUDY)

By E. M. HAWKS, M.D., NEW YORK CITY

THE purpose of this paper is to record some observations in regard to the ovary left after hysterectomy for fibroids. The study is based on a series of 84 cases from the service of Dr. E. H. Pool, Second Surgical Division, New York Hospital. The operations were performed in the years 1915 to 1919 inclusive. The examinations in the follow-up clinic were made by the members of the visiting staff.

Of 91 cases discharged 84 returned for examination. All were examined at least once and most of them several times. When this summary was made 50 had been followed one year; 26 two years; 14 three years; 10 four years and 6 five years.

In reviewing the reports an attempt was made to answer two questions: (1) What benefit was derived from leaving the ovaries? (2) What harm came from leaving them?

The most common symptom of the surgical menopause is the vasomotor disturbance called "flushes" by the patients. The patient feels a sense of heat and she says she has a "flush." When there is only this sense of warmth the flushes are classed in these observations as moderate. If the patient complains either of dizziness, faintness, choking or fear of death in addition to the feeling of heat, the flushes are termed severe. Observations were made as to the occurrence, time of onset, and severity of the flushes.

Three cases had passed the natural menopause by several years and in another case an adequate history had not been obtained. These four were not included in the subjective study.

For comparison the cases were grouped according to whether both ovaries had been removed, one ovary left, or both left.

When this review was made, all the cases had been examined at three months. At that time of 18 cases, who had had both ovaries removed, seven (39 per cent) had flushes, and in six of these they were severe. Of forty cases who had one ovary left seven (17 per cent) had flushes and in two they were severe. Of 21 cases with both ovaries retained, one (5 per cent) had flushes but not severely. So at three months there was a decided advantage in leaving both ovaries and considerable benefit in leaving one.

At one year there were eleven patients who had had both ovaries removed and seven (63 per cent) had flushes. There were twenty-four who had one ovary left and eight (33 per cent) had flushes. There



were fourteen with both ovaries retained and four (29 per cent) had flushes. There were no additional cases at this time in whom the flushes were severe.

At two years there were six cases in the first group and three (50 per cent) had flushes; twelve in the second group, four (33 per cent). In one case in this group, with one ovary left, the onset of the flushes was at two years and they were severe. There were eight cases in the third group and four (50 per cent) had flushes. That was a decided increase in the percentage in that group and there was one case in the same group who had severe flushes beginning at two years.

At three years there were five cases in the first group and two had flushes; seven in the second group and two had flushes; two in the third group and one had flushes.

At four years there were four in the first group and two had flushes; five in the second group and two had flushes; one in the third group and she had flushes.

At five years there were three in the first group and one had had flushes; three in the second group and two had had flushes. There were none in the third group.

*In short, the onset of the flushes was delayed when one ovary was left and further delayed when both were left. The severity was diminished when one ovary was left and almost eliminated when both were left.*

There were sixty-five cases who had one or both ovaries left. It has been the practice on this service not to remove healthy ovaries. So there was a comparatively large number of cases for study as to possible harm arising from retained ovaries.

Six of the sixty-five, at three months, complained of pain at the site of a retained ovary. This pain was transitory and no mention was made of it in any of the later reports of these cases. One of these and five others, at three months, had a mass two to three inches in diameter at the site of a retained ovary. These swellings were noted as having disappeared in five of the cases and no mention was made of it again in the sixth case. There was a seventh case who did not return for first examination until three years after operation. She had a cystic ovary six inches in diameter. She complained of frequent urgent micturition and was the only case referred for secondary operation. She had a positive Wassermann and the diagnosis of tabes was made when she had the hysterectomy. She did not enter the hospital for the second operation and has disappeared.

*Only one case had both pain and swelling in an ovary. In all, then, there were twelve cases of the sixty-five, or one in five, who had any trouble with the retained ovary. In eleven of the twelve it was temporary.*

It is interesting to note in regard to these women who had trouble

that, as Dickinson and Sampson claim, it seems preferable to leave the tube with the ovary. In twenty-eight cases in whom the tube was removed and the ovary left there was either pain or swelling at the site of the retained ovary in eight or in one in three. In thirty-



Fig. 1.—Section of recent corpus luteum, x13, from an ovary retained two years after hysterectomy.

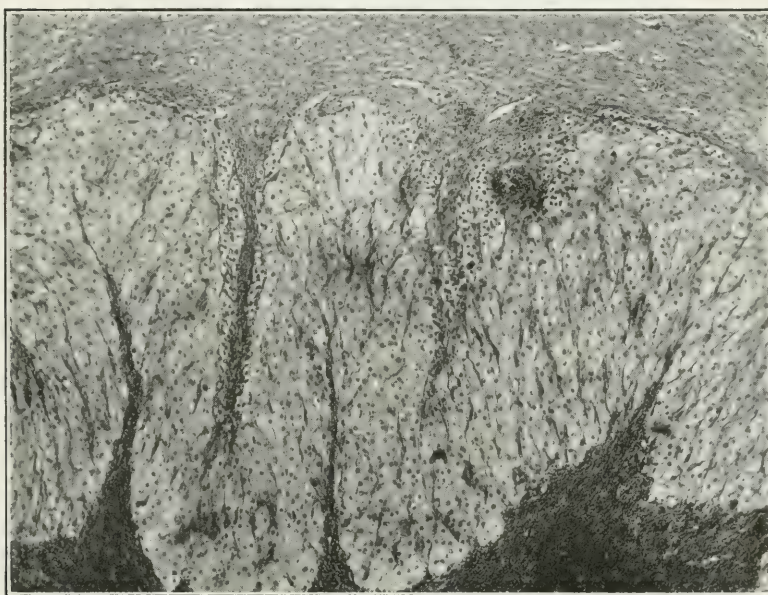


Fig. 2.—Section of same under high power.

seven women, on the other hand, who had the tube left with the ovary there was trouble in four or in one in nine. There was, then, one third the trouble with the tube and ovary left together that there was when the tube was removed. The case mentioned above, which was referred for secondary operation, had a retained ovary after removal of both tubes and the other ovary.

Objective evidence as to the condition of retained ovaries after two years was afforded by one case. She had had a supravaginal hysterectomy and double salpingectomy for fibroids and chronic salpingitis at the age of thirty-four. Two years later a secondary operation for incisional hernia was done. She had had flushes moderately, beginning one year after the hysterectomy.

The left ovary was found to be one-third larger than normal, appeared cystic, and was firmly adherent to the mesentery of the sigmoid. It was entirely removed, but in pieces on account of the adhesions. The right ovary appeared more nearly normal. A section of it was taken for examination.

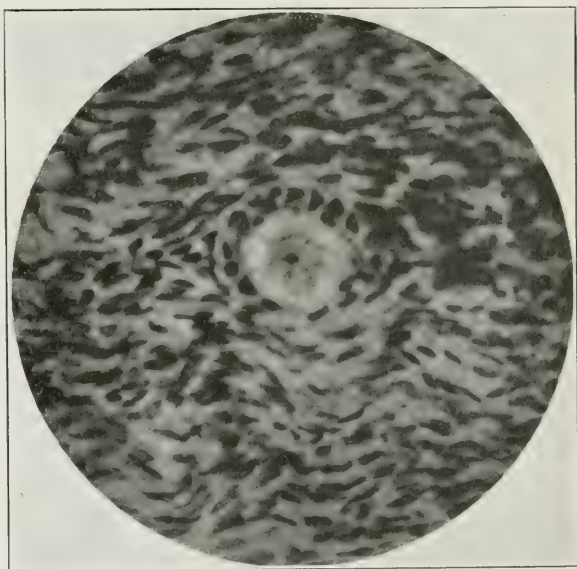


Fig. 3.—Section of graafian follicle with ovum from ovary retained two years after hysterectomy.

The pathologist's report on the pieces of the left ovary and on the section from the right was as follows:

"Specimen consists of; (A) three pieces of tissue, the two largest each about 2 cm. in diameter. One of these contains a corpus luteum, measuring in the fixed condition  $1\frac{1}{2} \times \frac{1}{2}$  cm., having a corrugated yellow rim surrounding a central hemorrhagic area. (Fig. 1.) The other, flatter, contains a few small clear cysts and a small corpus luteum measuring  $\frac{1}{2}$  cm. in diameter. (B) A small piece of tissue removed from the right ovary.

*Microscopic.*—One of the sections of (A) shows the typical features of a corpus luteum, containing red blood cells and fibrin, but there is only a very small amount of new connective tissue beginning to line the cavity. (Figs. 1 and 2.) A section of the ovary (A) shows numerous dilated blood vessels, many of them with thickened walls. There are also sections of later stages of corpora lutea, more or less completely fibrosed and a few follicular cysts. A section of (B) shows the material to consist of ovarian tissue with a small corpus luteum. The section shows but few graafian follicles. (Fig. 3.)



The pathologist's statement concerning the above report was that the presence of a fairly recent corpus luteum was evidence that the ovaries were functioning in so far as ovulation was concerned, but that an opinion concerning the internal secretory function could not be rendered on the basis of the morphologic evidence at hand. He also said that if we wished to speculate we might assume that the ovaries were elaborating their internal secretion inasmuch as they were apparently capable of carrying on the function of ovulation.

It is fair to conclude that these observations indicate that it is better to leave healthy ovaries and tubes after hysterectomy for fibroids done before or near the time of the menopause. This conclusion is based on the following points:

1. The onset of the vasomotor disturbance was delayed when one ovary was left and further delayed when both were left. The severity of the symptoms was diminished when one ovary was left and almost eliminated when both were left.

2. Very little serious harm was caused by a retained ovary. One case in sixty-five was referred for secondary operation on account of a cyst. Twelve cases in sixty-five complained of pain or had a swelling at the site of a retained ovary but in eleven of the twelve the trouble disappeared after about three months.

3. There was more trouble when the tube was removed than there was when it was left with the ovary.

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11 EAST FORTY-EIGHTH STREET.

(For discussion, see p. 977.)

# A STUDY OF THE HEMOGLOBIN AFTER CHILDBIRTH WITH SPECIAL REFERENCE TO THE RESUMPTION OF MENSTRUATION\*

BY M. PIERCE RUCKER, M.D., RICHMOND, VA.

WERE I inclined to levity on this occasion, I should define pregnancy as a disease of profound metabolic disturbance that terminates by crisis about the two hundred and eightieth day. The analogy could be pursued further in the same spirit of playfulness, in the consideration of its etiology and symptomatology. The chief factor in its causation has been well known for ages, as numerous passages in the Old Testament show. Modern medicine has been able to throw very little additional light upon the subject. Take, for instance, the question of natural immunity. Why some women never conceive is clouded in as much mystery now as it was in Biblical times. Then there is an acquired immunity, which is a sore subject to obstetricians. Yet truth compels me to state that even today, with abundant and sufficient knowledge of asepsis available, one attack of pregnancy too often confers a lasting protection.

But, whether we consider pregnancy a pathologic condition or a physiologic one, a study of the blood indicates that a profound change takes place. A decade ago, medical literature was full of reports of cases of pernicious anemia due to pregnancy. These cases occurred either before or after delivery, and the outcome was thought to be usually fatal, although Osler,<sup>1</sup> in a recent article, considered them to have a rather favorable prognosis. Thompson<sup>2</sup> studied the blood in twelve cases of "normal" pregnancy. He found that in the middle months of pregnancy there was a decrease in hemoglobin and an increase in leucocytes. As the patient approached term, there was an increase both in the percentage of hemoglobin and in the number of white cells. Bear<sup>3</sup> has shown that at the crisis, especially in primipara and in patients having hard labors, there is a leucocytosis, the count often reaching 18,000. So far as I have been able to find out, there has been no report of a study of the hemoglobin following delivery.

It is a popular belief that a woman does not menstruate so long as she nurses her baby. Why this should be, I cannot understand, for all the medical literature on the subject is opposed to this belief. Sundin,<sup>4</sup> in a study of 400 cases, found that from 55 per cent to 59 per cent menstruate while still nursing their babies, and that more than one-third

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\*Thesis submitted for admission to the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, 1920.

begin menstruating in the first two months after childbirth. Jacobius<sup>5</sup> found that 79 out of 180 lactating women were menstruating the sixth month after delivery. He was unable to make out that menstruation had any effect on the baby save possibly a very transient restlessness or diarrhea. He found no changes in the milk at this time. Sanes,<sup>6</sup> however, states that menstruation during lactation was not of the patient's usual type, it is frequently of longer intervals. The periods of amenorrhea preceding the establishment of menstruation were found to be variable. The patient's behavior in this respect varied with different pregnancies. Ehrenfest,<sup>7</sup> in a study of 209 patients and 309 births, finds that in over 80 per cent of all lactations first menstruation appears before the cessation of lactation. In primiparous women the percentage is still higher (84.6 per cent). He finds that retrodeviation of the uterus favors an early resumption of menstruation, 70.3 per cent as compared with 51.3 per cent of unclassified cases beginning to menstruate within twelve weeks postpartum. He concludes as follows: "A debilitating influence exerted immediately by labor and later by the loss of body fluids during lactation, with rare exceptions, temporarily arrests ovulation. As soon as the disturbed equilibrium is restored, the ovary resumes its function of ovulation, and the first corpus luteum sends its specific hormone to the endometrium. The response of the latter probably to a certain extent is dependent upon the anatomic condition of the uterus. If normal, a typical menstrual flow ensues; if subinvolved or for other reasons hyperemic (retroflexed) the reaction may be unusually strong. On the other hand, if the uterus is in an atrophic condition, it may require the stimulations from more than one ovulation until it becomes anatomically restored to the degree of resuming its function. As a rule, menstruation continues practically regularly during lactation when once established. The debilitating effect of lactation is obviously dependent upon the general condition of the woman. Therefore, usually the disturbance in the equilibrium of body fluids ends sooner and menstruation reappears earlier in the strong and healthy woman. For the same reason the amenorrheic state in general will last longer in the sick or weak woman, in the primigravida, whose labor, as a rule, is longer and more exhausting, and in the woman suckling a large child. But in the majority of women the equilibrium is regained before they have actually ceased to nurse their children, and, therefore, in the majority of instances menstruation reappears before the function of lactation is ended." It is not quite plain, either in Ehrenfest's analysis of his cases or in the fitting of his facts to Fraenkel's theory, why retrodisplacement of the uterus favors early restoration of ovulation.

Novak,<sup>8</sup> by correlating the histologic appearance of the corpus luteum removed at operation with the clinical history of the patient, finds that the corpus luteum matures at the time in the menstrual cycle in which the endometrium exhibits the premenstrual hypertrophy. He believes



that the luteum cells are concerned in the causation of the menstrual phenomena, and thinks that the paraluteum cells are concerned in the important function of fixation of the ovum in the early part of pregnancy. If I read Novak right, ovulation precedes menstruation by the length of time it takes the corpus luteum to develop, i. e., 28 days, and there is no need for an elaborate conjecture as to the condition of the uterus to explain why pregnancy may, as it often does, take place before menstruation reappears, as is done by Ehrenfest; or the assumption of a menstrual-inhibiting hormone formed by the lactating breast, as is done by Novak. The latter states that the amenorrhea of anemia, phthisis, and other

TABLE I  
SERIES OF 74 CASES WITH HEMOGLOBIN ESTIMATION

CASE NO.	HB. ON		MONTHS						REMARKS
	ADMIS.	I	II	III	IV	V	VI		
36	.	.	.	75	.	.	.	.	
40	.	.	.	84	.	.	.	.	Influenza
91	.	.	.	.	.	.	.	.	Hemoglobin 72% in the X month.
174	.	.	.	.	.	.	.	.	Hemoglobin 61% in the VII month.
234	.	.	.	.	.	.	80	.	
238	65	.	.	.	.	.	.	.	Hb. 70% in the IX and 85% in the XI Mo.
240	.	.	.	.	.	70	.	.	
254	75	.	.	.	.	.	.	.	Hb. 70% in the IX month.
261	60	.	.	.	.	.	77	.	
270	.	.	.	.	62	.	67	.	
279	.	.	.	63	.	.	.	.	
281	.	.	.	70	.	.	.	.	
285	85	.	.	.	80	.	.	.	
289	.	.	.	62	.	.	.	.	
292	.	.	.	60	.	.	.	.	
293	70	.	.	.	.	74	.	.	
304	.	.	68	.	.	.	.	.	
308	55	.	55	70	.	.	.	.	Broken kidney compensation.
310	.	.	74	.	.	.	.	.	
311	.	.	71	.	.	.	.	.	
312	.	.	70	.	.	.	.	.	
315	45	.	.	77	.	.	.	.	
322	80	.	.	80	.	.	.	.	
325	45	.	.	81	.	.	.	.	
326	95	.	70	.	.	76	.	.	
333	.	.	70	.	.	.	.	.	
336	85	.	.	.	.	.	.	.	
337	73	.	.	.	74	.	76	.	
341	61	.	85	.	.	.	.	.	
342	.	.	.	63	77	.	84	.	
343	.	.	.	70	.	60	.	.	Hookworm eggs found in stool.
346	90	.	85	.	.	.	.	.	
349	70	.	.	.	80	.	.	.	
354	60	.	.	.	.	.	.	.	

TABLE I—CONT'D  
 SERIES OF 74 CASES WITH HEMOGLOBIN ESTIMATION

CASE NO.	HB. ON ADMIS.	MONTHS						REMARKS
		I	II	III	IV	V	VI	
357	.	46	58	61	70	78	.	Postpartum hemorrhage.
352	.	.	.	.	62	.	.	.
361	62	.	90	.	.	.	.	.
363	.	.	67	.	70	.	.	Hookworm eggs found.
369	.	.	80	.	.	.	.	.
371	71	.	.	70	.	.	.	.
376	61	.	60	.	.	80	.	Influenza and pneumonia.
378	.	.	77	.	.	.	.	.
380	45	.	.	76	.	76	.	Mastitis with high fever in II month.
381	.	.	64	78	82	.	.	.
387	100	.	63	.	.	.	.	.
388	54	.	91	.	.	.	.	Wassermann four plus.
393	89	.	78	.	.	90	.	Wassermann four plus.
401	.	.	65	.	71	.	.	Hookworm eggs found.
403	28	.	42	.	.	.	.	Malaria.
404	63	.	76	.	.	.	.	.
405	75	.	80	.	.	.	.	.
406	80	.	70	70	.	.	.	Mastitis with temp. 103 in I month.
407	.	80	.	.	.	.	.	.
408	72	.	.	92	.	.	.	.
410	.	64	.	.	76	.	.	.
413	75	70	90	.	.	.	.	.
415	.	73	.	60	71	.	.	.
421	35	45	48	65	.	.	.	.
422	65	.	80	.	.	.	.	.
423	60	.	.	74	.	.	.	.
424	78	.	78	.	.	.	.	.
225	70	.	.	.	.	.	.	Hb. 67% in the VIII and 71% in the IX Mo.
427	82	.	78	72	.	.	.	Acute tonsillitis in the second month.
428	.	.	78	.	.	.	.	.
430	.	74	.	78	.	.	.	.
430½	.	65	.	.	.	.	.	.
435	70	65	.	.	.	.	.	.
440	.	.	.	80	.	.	.	.
441	.	.	.	70	.	.	.	.
444	75	.	76	.	.	.	.	.
449	.	.	.	71	.	.	.	.
451	72	.	80	.	.	.	.	.
466	.	58	67	.	.	.	.	.
461	.	75	85	.	.	.	.	Malaria.
AVER-		68.3	65	72.6	72	72.9	75.5	76.8
AGE								

debilitating conditions is due either to an inhibitory effect on the secretory cells of the corpus luteum, or, more probably to the failure of ovulation itself. Why not include pregnancy, labor, and possibly lactation in the debilitating conditions? As recovery takes place ovulation be-

gins anew, and as the resulting corpus luteum matures, menstruation starts again. This, however, may be arrested by the fertilization of the ovum.

The present study was undertaken to see what, if any, was the debilitating effect of child bearing. The percentage of hemoglobin was taken as a measure because, first, it was known to be decreased in pregnancy, and second, its estimation was easy. The analogy of the disturbance of menstruation in chlorosis to the amenorrhea of the puerperium makes the hemoglobin percentage a natural measuring rod for this work. All the determinations were made with the same instrument, a Sahli's hemoglobinometer. The subject material for the study was the best and most intelligent of my private practice together with cases seen at the Spring Street Home. The inmates of this institution must nurse their babies for four months, and for that length of time are under observation. The dispensary patients and the middle class patients cannot often be induced to cooperate in such a study as this. The patients were apparently free from disease except where noted in Table I. All save two had negative blood Wassermanns. Two others, in the second week postpartum, developed aching, fever, and enlarged spleen, and malarial organisms

TABLE II  
CASES THAT FLOWED FOR MORE THAN FOUR WEEKS

CASE NO.	HB. ON ADMIS.	I	II	III	IV	V	VI	REMARKS
40	.	.	.	84	.	.	.	.
91	.	.	.	.	.	.	.	Hb. 72% in X month.
174	.	.	.	.	.	.	.	Hb. 61% in VII month.
270	.	.	.	.	62	.	67	.
325	45	.	.	81	.	.	.	.
346	90	.	85	.	.	.	.	.
349	70	.	.	.	80	.	.	Anteflexed uterus
357	.	46	58	61	70	78	.	.
378	.	.	77	.	.	.	.	Anteflexed uterus.
381	.	.	63	78	82	.	.	Anteflexed uterus.
387	100	.	63	.	.	.	.	Anteflexed uterus.
403	28	.	42	.	.	.	.	Anteflexed uterus.
410	.	64	.	.	76	.	.	.
413	75	70	90	.	.	.	.	Anteflexed uterus.
415	.	73	.	60	71	.	.	.
421	35	45	48	65	.	.	.	Retroflexed uterus.
427	82	.	78	72	.	.	.	Retroverted uterus.
430	.	74	78	.	.	.	.	.
430½	.	65	.	.	.	.	.	.
435	70	65	.	.	.	.	.	Retroverted uterus.
441	.	.	.	70	.	.	.	.
449	.	.	.	71	.	.	.	.
451	72	.	80	.	.	.	.	Retroverted uterus.
466	—	58	67	.	.	.	.	.
AVERAGE	66.7	62.2	69	71.3	73.5	78	67	



were found in the blood. These cases of malaria were treated with quinine. Cases 357 and 413 were given cacodylate of soda. Otherwise there was no medication that could have had any possible effect on ovulation or menstruation.

Table I gives the entire series of 74 patients with the hemoglobin arranged according to the time it was taken. The first column gives the hemoglobin percentage when the patient was first seen, usually about the middle of pregnancy. The other columns give the percentages in the various lunar months postpartum. You will see at once that, where more than one determination was made in the puerperium, there was a steady increase in the hemoglobin with the following exceptions: Cases 380 and 406 had a stationary hemoglobin, and both cases had mastitis after leaving the hospital. Cases 343, 415 and 427 showed a decline in hemoglobin percentage. The first of these had uncinariasis. The last had an acute attack of tonsillitis between the two examinations. The average hemoglobin percentage for the various periods is suggestive. On admission the average percentage was found to be 68.3 per cent. In the first month postpartum it had fallen to 65 per cent and then there was a steady rise until the sixth lunar month. After this time the figures are too few to give any real average. Thus we see that, both individually and collectively, we have a gradual improvement in the hemoglobin from the first to the sixth month. If we classify the cases according to their behavior towards menstruation, we get quite a different picture. Table II contains all cases that had a bloody discharge for four or more weeks postpartum. This flow is essentially an anatomic one, and differs in its etiology from the menstrual flow, which has its origin in the activity of the corpus luteum. The average readings of these twenty-four cases are lower in the first three columns than those of Table I. Four of these patients, or 16.66 per cent, began to menstruate in the second lunar month. One menstruated in the fifth, and two in the ninth lunar month. In other words, only 37.6 per cent of these patients were menstruating by the end of the sixteenth week postpartum. When we compare this with Table I, or the unclassified cases, we see a marked difference. Of the unclassified cases, 31.1 per cent were menstruating in the second lunar month, 16.2 per cent more in the third, and an additional 6.7 per cent in the fourth lunar month, making a total of 54 per cent who were menstruating in the first sixteen weeks after delivery. Thus we see that patients in Table II are somewhat substandard, as is shown by the slowness with which their endometrii heal, the lower hemoglobin percentages, and the delayed reappearance of the menstrual flow.

Table III gives the cases arranged in groups according to when the resumption of menstruation took place. Group A, or the patients that began to menstruate in the second lunar month, has a slightly higher hemoglobin percentage on admission than Table I. The postpartum rise, however, is more rapid, the figures being: 74, 75.1, 74.5, 77.7, 75, 84. Group B, or the cases that did not begin to menstruate until the third

lunar month, has a much lower antepartum hemoglobin, and the postpartum rise is slower. Groups C, D, E, F and G contain so few cases that they may be disregarded. It is interesting to study the individual cases of this table. In twenty cases the hemoglobin was determined at

TABLE III  
CASES CLASSIFIED ACCORDING TO MONTH THEY BEGAN TO MENSTRUATE

CASE NO.	HB. ON ADMIS.		MONTHS						REMARKS
	I	II	III	IV	V	VI			
<i>A. Cases beginning to menstruate in the second lunar month.</i>									
36	.	.	75	.	.	.	.	.	
285	85	.	.	80	.	.	.	.	Retroflexed uterus.
304	.	68	.	.	.	.	.	.	
308	55	55	70	.	.	.	.	.	Anteflexed uterus, stillborn baby.
310	.	74	.	.	.	.	.	.	Anteflexed uterus.
315	45	.	77	.	.	.	.	.	
322	80	.	80	.	.	.	.	.	
333	.	70	.	.	.	.	.	.	Anteflexed uterus.
342	.	.	63	77	.	84	.	.	Anteflexed uterus.
343	.	.	70	.	80	.	.	.	
361	62	90	.	.	.	.	.	.	Anteflexed uterus.
371	71	.	70	.	.	.	.	.	Anteflexed uterus.
380	45	76	.	76	.	.	.	.	Anteflexed uterus.
387	100	63	.	.	.	.	.	.	Anteflexed uterus.
388	54	91	.	.	.	.	.	.	Anteflexed uterus.
393	89	78	.	.	90	.	.	.	Stillborn baby.
408	72	.	92	.	.	.	.	.	Retroflexed uterus.
423	60	.	74	.	.	.	.	.	
424	78	78	.	.	.	.	.	.	Anteflexed uterus, baby died when one day old.
428	.	78	.	.	.	.	.	.	Anteflexed uterus.
430	.	74	78	.	.	.	.	.	
444	75	76	.	.	.	.	.	.	Retroflexed uterus, stillborn baby.
449	.	.	71	.	.	.	.	.	
451	72	80	.	.	.	.	.	.	Retroflexed uterus.
AVERAGE	69.5	74	75.1	74.5	77.7	75	84		
<i>B. Cases beginning to menstruate in the third lunar month.</i>									
261	60	.	.	.	.	77	.	.	Anteflexed uterus.
279	.	.	63	.	.	.	.	.	
293	70	.	.	.	74	.	.	.	Stillborn baby.
325	45	.	81	.	.	.	.	.	
346	90	85	.	.	.	.	.	.	
381	.	63	78	82	.	.	.	.	Anteflexed uterus, Stillborn baby.
403	28	42	.	.	.	.	.	.	Anteflexed uterus.
404	63	76	.	.	.	.	.	.	Anteflexed uterus.
407	.	80	.	.	.	.	.	.	Anteflexed uterus.
410	.	64	.	76	.	.	.	.	
435	70	65	.	.	.	.	.	.	Anteflexed uterus.
AVERAGE	60.9	67.7	66.5	74	79	74	77		

TABLE III—CONT'D  
 CASES CLASSIFIED ACCORDING TO MONTH THEY BEGAN TO MENSTRUATE

CASE	HB. ON	MONTHS						REMARKS
NO.	ADMIS.	I	II	III	IV	V	VI	
<i>C. Cases beginning to menstruate in the fourth lunar month.</i>								
238	65	.	.	.	.	.	.	Retroflexed uterus.
312	.	.	70	.	.	.	.	.
326	95	.	70	.	.	76	.	.
349	70	.	.	.	80	.	.	Anteflexed uterus.
352	.	.	.	.	62	.	.	.
376	61	.	60	.	.	80	.	Weaned the baby on account of mother's lung condition.
<i>D. Cases menstruating first in the fifth lunar month.</i>								
337	73	.	.	.	74	.	76	Anteflexed uterus.
354	60	.	.	.	.	.	.	Anteflexed uterus.
357	.	46	58	61	70	78	.	.
<i>E. Cases menstruating first in the sixth lunar month.</i>								
234	.	.	.	.	.	.	80	.
240	.	.	.	.	.	70	.	.
<i>F. Cases menstruating the first time in the seventh lunar month.</i>								
225	70	.	.	.	.	.	.	Hemoglobin was 67% in the IX & 71% in the X mos.
<i>G. Cases that did not menstruate in the first seven months after childbirth.</i>								
91	.	.	.	.	.	.	.	Hemoglobin was 72% in the X month.
254	75	.	.	.	.	.	.	Hemoglobin was 70% in the IX month.
270	.	.	.	.	62	.	67	.
311	.	.	71	.	.	.	.	.

the time menstruation reappeared. The average percentage of hemoglobin at this time is 74.9 per cent. The extremes are 55 per cent and 91 per cent. The former had a 55 per cent hemoglobin when first seen, and it is possible that her ovaries had become accustomed to functioning in an impoverished medium.

In order to readily fix the attention to the time of resumption of menstruation, I have dropped a perpendicular line in front of the month in which menstruation was resumed. In Group G this line was drawn after all the figures, for the reason that these cases have been followed for seven or more months and have not menstruated. You will see at once that with six exceptions, no figure to the right of the menstrual line is smaller than the percentage of hemoglobin upon admission. The exceptions are Nos. 285, 371, 387, 393, 326 and 225. Of these, Nos. 285, 387, 393 and 326, all had unusually high hemoglobin percentages when first seen, and even a good postpartum hemoglobin would be below these figures. In No. 371 the figures are practically the same. In No. 225 the



explanation is probably the same as in the case with the 55 per cent hemoglobin. This patient had always been anemic, and the ovaries had become accustomed to working in the changed environment. Even the six months postpartum in which the patient was anemic and amenorrheic was a long enough time to accomplish this.

In regard to the effect of retrodisplacement as a cause for the early resumption of menstruation, my data is very limited. It is, however, in accord with Ehrenfest. I have notes in five cases of retroversion as to the time the menstrual flow reappeared, four of them, or 80 per cent, menstruated in the second lunar month, and the remaining 20 per cent in the fourth month. It occurs to me that the pelvic hyperemia incident to the misplacement of the uterus is a factor in hastening ovulation.

The effect of lactation or the lack of lactation does not seem to be so marked. Eleven of my cases, for various causes, death of the baby, condition of the breasts, intercurrent influenza and pneumonia, etc., lactated only a very short time; 45.4 per cent of these menstruated in the second month, and 36.3 per cent in the third month. One, however, did not menstruate for a year. The difference between these percentages and the 31.1 per cent of Table I cases that menstruated in the second month and the 16.2 per cent that began menstruating in the third month, represents, it seems to me, the debilitating effect of lactation, rather than the effect of not having an inhibiting hormone from the functioning breast. If there were any such hormone, its absence in these cases should show bigger results, say something comparable to the effect of retrodisplacement.

#### CONCLUSIONS

My cases are too few for me to present very decided conclusions. It would seem, however, that hemoglobin is a deciding factor in the postpartum resumption of menstruation. Immediately after delivery there is a definite drop in the hemoglobin from which the patient slowly recovers. The average case begins menstruating when the hemoglobin reaches about 75 per cent. Certain cases menstruate with a much lower hemoglobin, and these are patients who have had some anemia for a long time. Retrodisplacement with its pelvic hyperemia is also a factor in the early restoration of the menstrual phenomena.

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# Society Transactions

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## NEW YORK ACADEMY OF MEDICINE SECTION ON OBSTETRICS AND GYNECOLOGY. MEETING HELD DECEMBER 28, 1920.

DR. LILLIAN K. P. FARRAR IN THE CHAIR

DR. GEORGE W. KOSMAK reported a case of **Cephalhematoma of Serious Type.**

Mrs. T. W., age thirty-six, para i, was confined at the Lying-In Hospital, November 27th, after a normal labor of about sixteen hours. Pelvic measurements normal, outlet roomy. The labor itself was uneventful, vertex, L. O. A. Baby cried spontaneously, weighed 3650 grams; 51 cms. long, and apparently normal. On the day after labor a swelling was noticed over the right occipitoparietal region which increased steadily in size until the fourth day, when it was about one-third the size of the entire head. At the same time the baby presented the appearance of a marked anemia, became listless, drowsy and did not nurse well. A diagnosis of cephalhematoma with continued bleeding and partial exsanguination was made, but in view of the possibility of a hemophilia, no blood count was made at this time. Immediate treatment was necessary to save the baby and the injection of normal human blood serum was begun,—30 c.c. being given subcutaneously in the back on the fourth day postpartum. No further change occurred and little improvement was noted after another dose on the next day. Four days later the hematoma appeared to be even larger and the baby became very pale.

Examination of the baby's blood (December 5) showed it to be in Group II and the mother in Group IV. A suitable donor was found and a citrated blood mixture prepared, of which 80 c.c. was given into the median basilic vein of the right arm. On the next day 20 c.c. of whole blood was given subcutaneously both in the morning and afternoon, and on the next day, the tenth postpartum, 15 c.c. of blood serum was given between the shoulder blades. This resulted in considerable local tumefaction which persisted for several days. A blood count on the eleventh day postpartum, that is, after the administration of the blood and serum, showed a total of 2,740,000 red cells with 11,600 leukocytes and 55 per cent hemoglobin. Improvement began after the transfusion and continued rapidly, so that the baby could be discharged on the thirteenth day. The highest temperature was 101.2° F., on the sixth day postpartum. The baby was last seen on December 17th—twenty days postpartum and, while still pale, seemed otherwise normal. A blood count on the latter date showed that the red cells numbered about 2,600,000, with 10,800 white cells and 60 per cent hemoglobin.

In reporting the case, attention must be called to the rapidly progressing exsanguination of the child which, judging from the general appearance, would undoubtedly have proceeded to a fatal issue, had the process not been halted by the administrations of the serum and blood. When last seen the hematoma had been stationary, was soft, showed no evidences of inflammation and the baby nursed well and seemed in good general condition.

## DISCUSSION

DR. H. N. VINEBERG.—The only serious case of the kind I have had was in the baby of a hemophiliac mother. The hemophilia was as severe as it could be and the woman continue to live. She bled on the slightest provocation from the nose and ears. Strange to say she went through her pregnancy easily, and after delivery and during the puerperium the bleeding was not excessive. Low forceps were used without much traction. The baby was normal at birth and nothing was seen for the first day or two; then a hematoma of the scalp was noticed which rapidly increased in size, and the child was losing rapidly and looked as though it would go out in twenty-four to twenty-eight hours. A blood transfusion arrested the hemorrhage and the baby recovered. Later the mother went on having hemorrhages, as had been her habit.

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DR. WILLIAM F. KENNEDY presented a report on a case of **Suspended Ovarian Activity and Its Treatment with Endocrines.**

This patient, born in the United States, a housewife, 24 years of age, and married four years, gave a negative family history. She had always lived an active physical life and been out of doors much of the time. Her husband was in good health.

The patient's menses began at 12 years, were of the 28-day type and regular. They lasted two or three days, with small amount of bleeding and no pain. At 14 years of age menstruation ceased for one year. The patient took medication and hot foot baths to stimulate her menstruation which then became regular for the next six years. She was married, and eight months after marriage became pregnant, and two months later the excitement caused by a murder scene in a movie brought on a miscarriage. She was in bed four days. The next menstrual period was absent; then four periods were present—the last of these being June, 1918. After skipping the time of the next regular period, the patient thought she was pregnant again because she had nausea, vomiting, frequent micturition, and shooting pains in the breasts. However, she did not become pregnant until November, 1918. In April, 1919, her family physician gave her medical treatment to reduce a tumor of the uterus. The same month the patient was seen by a prominent obstetrician who was uncertain of pregnancy, but who, in May, heard the fetal heart. In June bleeding began and a cesarean section was done at the Woman's Hospital to secure a living baby. The patient had a normal convalescence and menstruated in July, 1919. In October, 1919, the patient came to the Out-Patient Department of the Woman's Hospital for the relief of amenorrhea, hot flashes, headaches, backache, shooting pains in the pelvis and pain and a burning sensation in both breasts, which had been present since July. The patient presented the picture of health. She weighed 140 pounds. Her blood pressure was 128/80. The thyroid was prominent; pulse slow; heart normal in position and size with good muscle sound, lungs negative, breasts normal; abdominal scar tender. The cervix was blue, with a small erosion and some slight discharge. The uterus was retroverted in the first degree, soft and slightly enlarged. The appendages were negative. The urine examination was negative. Thyroid and corpus luteum extracts were prescribed and taken for nine weeks; also elixir of glycerophosphates was taken for part of the time.

The patient returned to the clinic in April, 1920, with severe headaches and pains in both sides of the pelvis. Physical examination was negative. She was given a preparation of mixed glands containing: thymus 2 gr.; thyroid 1/5 gr.; anterior pituitary 1/2 gr.; suprarenal 1/4 gr.; barium 1/2 gr.; mamos 1/2 gr.; cerebri 1/2 gr. This was taken regularly for nine weeks, or until August 1, 1920. On September 30,



1920; the patient returned with the uterus about the size of a ten weeks' pregnancy. On December 12, 1920, the patient said she felt the baby moving.

This coincidence of a woman becoming pregnant while under the influence of the endocrine substances may mean that the ovary produced fully developed ova as a result of either the rest from the normal ovarian function or the stimulation of ovarian activity by the endocrine substances. In this case both were equally probable.

#### DISCUSSION

DR. SAMUEL W. BANDLER.—The important point in this case I should say was that the menstrual tendency was rather unstable. As I remember there was an amenorrhea of a year, early, when the patient was 14 years of age; then at a subsequent period there was a tendency to amenorrhea. It is quite impossible from listening to the report of the case to gauge accurately just where the weakness in the tendency to menstruate occurred. There was subsequently an amenorrhea which did not yield to corpus luteum and thyroid extracts. That, however, does not necessarily prove anything, though it may throw a little light on the present tendency to use ovarian and corpus luteum extracts indiscriminately. Again, it could not be said that giving corpus luteum definitely caused cessation of menstruation. Experience in a large number of cases shows that amenorrhea is not always influenced by corpus luteum and thyroid. If one studies the physiology one would expect the corpus luteum to diminish or retard rather than bring on menstruation. Later on in this case five or six kinds of extracts were given and the patient became pregnant without having menstruated. I would feel that the thymus had not had a stimulating effect. It is within our province to say that neither the ovarian nor thyroid glands of the patient were effective but that does not add to the scientific value of the observations. The patient had no decided atrophy of the genitalia because she had a second child, and there must therefore have been ovulation. Both ovarian and pituitary extracts may have produced ovulation. Speaking of ovulation and menstruation, we must not assume that every woman who ovulates, menstruates nor must we assume that all those who do menstruate, ovulate. In this case I think we must attribute the good results to the gunshot prescription of glandular extracts, but so far as giving definite information the patient's history alone does not explain where the glandular anomaly lay, but the pluriglandular prescription seems to have met the indications here.

DR. NANCY JENNISON.—As I understand from the report there were two pregnancies, one with gland therapy and one without such therapy, so it seems to me there is no definite evidence that the gland therapy made the pregnancy possible.

DR. CURRIER.—While we cannot say positively that the gland therapy made the second pregnancy possible, we do know that other symptoms were favorably influenced by this treatment.

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#### DR. R. H. POMEROY made a report on the **Type of Results of Median Perineotomy and Repair, with Demonstration of Cases.**

The most that I can claim is that the cases I am reporting are illustrations rather than demonstrations. Cases must go for a long period of time before we can state that episiotomy has given a permanently good pelvic floor. It seems to me to be out of order at the present time to occupy much time except to state the proposition I have been trying to promulgate. There are two types of situations to be taken into consideration. The first is that of the primipara who has progressed to such

a degree of distention of the pelvic floor that it becomes evident that there is going to be a laceration. When the sphincter ani is dilated two inches, a so-called tension suture is placed across the perineum and incision is made in the median line sufficient to release the head. The incision may be carried down to the sphincter and up to the vagina. The second situation is where there is reason to believe that it is necessary to terminate the second stage of labor before there is material tension, and that there will be a separation of the perineal structures.

The types of cases and results are four in number. The first type is illustrated by a private patient, 35 years of age, a primipara, who had the funnel-shaped type of pelvis without it being sufficiently marked to indicate cesarean section. The position of the fetus was L. O. A. The patient went through 12 hours of labor when it was demonstrated by the distention of the pelvic floor and the uterine pains that there would be a deep laceration. An incision was made in the median line down to and through the sphincter. Extraction in this case was not difficult, but the child had the cord around its neck and died on the third day as the result of cerebral hemorrhage.

I hope to demonstrate that the present condition of this woman shows that the pelvic floor is perfectly good in spite of the fact that she has a short posterior sagittal pelvis. This patient is not presented to determine whether or not a cesarean section should have been performed, but simply to show that though she had a funnel-shaped pelvis, delivery was safely effected by means of a median episiotomy and that the woman now has a good pelvic floor.

The other three cases illustrate types of cases in which the resident physician can carry out this procedure. The first type illustrates that the median incision is comparatively simple even if carried through the sphincter compared to condition arising from a deep lateral tear. The second type illustrates that where the head is engaged deeply in the O. P. position, a position which is most treacherous for a resident to work out himself, he may still cope with the condition. In this instance the head was rotated with short forceps at the outlet, and a median incision was made deeply. We were not sure whether the sphincter was cut through or torn through. A point not to be lost sight of is that there must be a definite dilatation of the sphincter before the incision is made, so that when tension is removed there will be a relaxed union. In this case the child lived and was in good condition. The second type of case in which the resident can handle the situation is that in which there is necessity for a hasty termination of the second stage of labor in the interests of the child. In this case the child weighed 8 pounds, 9 ounces; the fetal heart was down to 100 and was irregular. The instructions were to deliver it with the incision in the median line. This was done. This patient shows a perfectly good pelvic floor. In a third type of case the incision is made as soon as there is any definite fissuring, and following the incision the extraction may be effected by forceps control rather than forceps extraction.

I want to make two very definite claims for this procedure which I expect it will take years to demonstrate. We have been carrying out this plan long enough to be very sure as to the results as we see the cases from six to twelve weeks postpartum. There are practically no prolapses of the anterior vaginal wall and no cystoceles, owing to the removal of tension at the posterior portion of the outlet which lessens the drag on the anterior segment. Another important point is that this is not a procedure which can be carried on by any journeyman obstetrician. Following the employment of this procedure we have had no failures resulting in incontinence.

DR. VINEBERG (reporting on patients exhibited).—My own impression is that the cases show very good results from median episiotomy. One cannot tell except by

the slightest scar that the sphincter has been cut. The first case we thought showed slight rectocele. The third case is still only a short time after delivery and there is still some redundancy of the anterior vaginal wall, and there seems to be some urethrocele. In another case the results are simply ideal. The perineum is good and there is no protrusion of the anterior or posterior vaginal wall.

DR. JOHN VAN DOREN YOUNG.—Dr. Pomeroy demonstrated the great value of median perineal incision in preference to the lateral incision when it becomes necessary to enlarge the birth canal. However, I would emphasize the need of caution in the use of this procedure. The use of this procedure without judgment may result in unnecessary damage. As to cutting through the sphincter, this is something to be avoided if possible. In one of the cases presented there is a noticeable protrusion of the vaginal wall. Trauma to the fascia seems to be well marked in one or two of the cases, and this might have been prevented. The posterior vaginal wall should be watched and protected from trauma, and incision should antedate trauma. Certain of the results following this procedure are as perfect as it is possible to have them.

DR. FREDERICK C. HOLDEN.—It has been my privilege to follow the teachings of Dr. Pomeroy for a number of years. Without referring to my statistics I think I am safe in saying that I do the median episiotomy in over ninety per cent of the primiparae whom I attend. Formerly I was very much chagrined to have women return at five weeks' postpartum and find that there was a decided relaxed introitus in cases where it was not possible under the best conditions to find any visible tear after delivery. It always seemed to me that there must have been minute tears under the mucous membranes similar to the breaking of the elastic in an elastic stocking with the fabric remaining intact. Since using this procedure I have had no similar occurrences and the results have been uniformly good. I think I cut the perineum a little sooner than Dr. Pomeroy does as I can see no reason for so much delay. I most heartily indorse the procedure.

DR. BANDLER.—This procedure has, in my hands, entirely replaced the lateral incision or incisions. I have had the same demonstration of its value as the other speakers and approve of it as saving time, relieving long-continued pressure by the head and favoring absolutely normal restoration by simple clean sewing.

DR. POMEROY.—There is no need to debate the advantages of substituting a clean cut for a ragged tear, for I submit that there can be no comparison between a ragged tear either from voluntary expulsion or forceps extraction under mechanical difficulties and a clean cut. Of course it is always a choice of difficulties. The different types of cases presented are not for the purpose of showing the perfection of the results but the conviction on my part that a lacerating extraction or a lateral episiotomy would have produced much worse results than those seen in these cases, though we must concede that it is a choice of evils.

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DR. EVERETT M. HAWKS read a paper entitled **The Ovary After Hysterectomy: A Follow-up Study**. (For the original paper see page 959.)

#### DISCUSSION

DR. GEORGE GRAY WARD, JR.—I would like to call attention to the fact that in the figures given by Dr. Hawks the age of the patients certainly should be given great consideration in drawing conclusions. Also the number of cases upon



which he has based his percentages is not sufficient to permit of deductions. He should have had a sufficiently large number of cases to compare equally those who had and those who did not have the ovaries removed. The cases with one or both ovaries retained were so few that percentages based on them cannot be of value.

I can recall four or five cases of atrophy of the vagina at present in which this condition has been quite troublesome. I have also seen cases with serious epileptiform disturbances following oophorectomy in younger women. The great point, I think, is to try to conserve the circulation. It is better to have the ovary for two years than to have it taken out, and personally I always conserve it if it is possible to do so, and the times I have regretted it are comparatively few.

DR. HARVEY B. MATTHEWS.—Dr. Hawks' paper is certainly very enlightening. I do not recall that he mentioned the ages of the patients. The age is an important consideration in the conservation of the ovaries. One point he brings out is that the life history of the ovary after hysterectomy is about two years. In Group I he starts with 39 per cent having hot flashes, while at the end of two years 50 per cent had hot flashes. This is just the same percentage as in those women who had both ovaries taken out, and that proves conclusively that the life history of the ovary is usually about two years.

As to the effect of oophorectomy in connection with hysterectomy for fibroids and inflammatory conditions, it makes no difference for which reason the hysterectomy is done, except as it is influenced by contiguous pathology. Dr. Polak, in 1915, reported 132 cases of conservation of the ovary after hysterectomy, and later, 1918, presented a report of 73 cases of conservation of one or both ovaries which were reoperated from which he concludes: 1. That routine conservation of the ovary without due consideration of the ovarian and contiguous pathology as it exists in the individual case is not good teaching. That is as a routine procedure we do not want to conserve an ovary with a thickened tunica or one bound down by adhesions. 2. That regeneration of the conserved ovary depends largely on the type and duration of existing infection and the condition of the tunica of the individual ovary. 3. That even when the most detailed technic is observed, the ovarian circulation is impaired. 4. That the retained ovary without the uterus and tube is always a focus for possible trouble. 5. That the life history of a retained ovary is of short duration 2 to 5 years and that the trophic influence of the diseased ovary has been overestimated. Finally, that a cured patient has fewer nervous symptoms. As has been brought out by both Dr. Hawks and Dr. Bailey, ovulation without menstruation is not as good as ovulation with menstruation. There is something in connection with the flux of blood from the endometrium that we do not get when the endometrium is removed. The life history of a good ovary is only about two years and that of a diseased ovary from six months to a year.

DR. HENRY C. COE.—I wish to speak more particularly of the conservation of the ovaries after hysterectomy for fibroids. The two points raised are whether the ovary should be saved, and whether if it is saved any harm results. In my experience I can recall when every ovary that could be palpated was "arrested on suspicion" and many were removed that now would be thought quite normal. As a young beginner I remember returning after seeing the older men of that day operate and feeling satisfied that the operator was not able to decide what was a diseased ovary macroscopically. If a few follicles are dropsical, or there is a thickened cortex, to consider it hopeless has been a tempting conclusion. However, with some of these ovaries one may exercise an unwise conservatism. I know that I have had cases in which I have let the ovary alone when it might have been better to have removed it. In women under 40 I have tried to save at least one ovary, for one

ovary conserves the function practically as well as two. I have seen pathological conditions after leaving the ovary such as cysts in the broad ligament and cystic degeneration of the ovary, but never cystadenoma. When we come to the question of cirrhotic ovaries, we find these the most painful of all and they usually require a secondary operation. Yet patients may become pregnant with both ovaries cystic, or even with double dermoids, so that we used to err on the other side.

I have lately been able to follow up cases of supravaginal amputation for fibroids, operated upon from 5 to 20 years ago and it is interesting to observe what slight disturbances these patients have had. I believe with our more perfect technic and with our care not to impair the circulation of the ovaries we shall be able to speak more *ex cathedra* on this question of judgment as to when the ovaries should be removed and when left.

I have seen little good come from the unwise conservation of ovaries, though I believe that we should be conservative in younger women. Now when a woman puts herself in the hands of a surgeon for a hysterectomy, or for a supravaginal amputation she is willing that he should do what is necessary, and in such a situation the question of hot flashes does not have so much weight with her. The younger men have no idea of the cases of extreme nervousness that we used to see following oophorectomy. The man who had young women coming to him after operation complaining of intense flushing with melancholia or perhaps epileptiform seizures, who were the bane of his existence, had a different idea of oophorectomy than we have today. As to atrophy of the vagina, that is an important point from the sexual and matrimonial standpoint, and one that is worthy of consideration in view of its bearing on the future health and happiness of the individual. This whole question is very interesting. I can remember when we knew little about the anatomy of the ovary, still less about the pathology, and nothing at all about the internal secretion, and as our knowledge of these subjects increases our views with regard to the ovary must undergo change.

DR. EDWARD WALLACE LEE.—This question is exceedingly interesting and it is going to be a long time before it is positively answered, that is scientifically answered because men have various views on the matter. The whole thing hinges on two ideas: What is the pathology with which we are dealing, and what is the physiology with which we are dealing? If one makes an abdominal incision for the sake of doing a myomectomy or a hysterectomy he sees the condition the ovaries are in, and if they are in anything like a normal condition they may be left and the circulation further conserved, leaving it in as nearly normal position as possible, and then the results will be comparatively satisfactory. If the ovary is diseased it should come out with the uterus. The conservation of the ovary is like the conservation of any other part of the body, the teeth, the legs or the fingers. It all depends upon the pathology and upon the physiology. You at the time of operation must be the one to judge what you will do. Like Dr. Coe, I formerly did many oophorectomies. From 1886 to 1916 I made 300 abdominal sections for the sole purpose of removing the ovaries because at that time oophorectomy was quite the thing, and I want to say that it was not such an awful thing. Sometimes we removed both ovaries and sometimes only one according to the indications. They had the same symptoms then that you say the women now have after the ovaries have been removed. We have removed them for dysmenorrhea, when they were cystic and adherent, for any pathological condition, and when on bimanual palpation they gave pain.

Dr. Coe speaks of epileptiform seizures following oophorectomy. I have never seen those cases. He speaks of atrophy of the vagina. I have not seen that and I

have never seen diminution of sexual desire in women following oophorectomy. It was claimed at one time that after oophorectomy women became masculine in appearance. That is not so. I would not remove a normal ovary and I do not know that I ever did; all these ovaries that I removed appeared to me to be abnormal and the tendency was to consider that they should come out. Up to 20 years ago large ovarian cysts were quite common. We seldom meet with them now, and I believe one reason is that small ovarian cysts are now more frequently removed.

DR. VINEBERG.—I am interested because it has been my misfortune to have had results where I have left an ovary after hysterectomy. One woman had three serious operations in consequence of my having left an ovary. The ovary became cystic and adherent to the intestine. In another case I left a perfectly normal ovary as the woman was anxious to have it conserved. At the end of three months she returned with a cystic ovary. Such an analysis as Dr. Hawks has given us is of value but it is not complete without the ages of the patients and their condition at the time of operation. I feel that in doing a hysterectomy the ovaries should be removed. In studying the literature a very interesting point is brought out. In many instances after the menopause when the uterus is removed there is a recurrence of the menopause symptoms. This seems to be due to some injury to the pelvic nerves. Mandel and Buerger in speaking of the conservation of the ovary in young women have collected a series of 101 cases, in 51 of which the menopause symptoms were very severe in women of 45 and up. From the age of forty-five up to fifty-two the menopause symptoms were just as severe as in the younger women. That is a surprise to many of us. When the ovaries are removed at about the menopause some suffer more than the younger women do. It is very hard to decide the question as to whether or not to leave an ovary. The question of preserving the circulation of the ovary was brought up in 1886 by Olshausen, who was under the impression that if you preserved the branches from the uterine artery to the ovary the circulation was preserved. He thought he was successful in doing this but it was shown later that he was mistaken. You cannot remove the uterus without cutting the branch of the uterine artery between the uterus and ovary. In a most careful dissection on the cadaver this was definitely proved.

DR. HERMANN GRAD.—I am interested because I do not know of a greater problem than that of deciding which ovary to leave and which to remove. It has been my experience on three occasions that the conserved ovary had to be removed later because of complicating conditions. In one case, that of a young woman 37 years of age, the ovary was perfectly healthy. By the most careful technic the ovary was conserved and the patient made a good recovery. The third week after operation she began to run a temperature and finally it was found that she had an ovarian abscess. She was a very sick woman for many weeks and it finally became necessary to cut through the cervix in order to get drainage. The patient recovered and has remained well. In the second case I also left an apparently healthy ovary in a woman about 35 years of age. There was no question of infection in this case. The woman developed an ovarian cyst three years later and the ovary had to be removed to relieve pain. The removal was made through an abdominal stetion, the patient developed a postoperative ileus, which made it necessary to open the abdomen again in order to save her life. These two cases illustrate that there is a great deal more to be said about conserving the ovary than what has been said about the symptoms of menopause and internal secretion; we must take into consideration the complications that may follow in leaving the ovary.

DR. LEE.—How did you know you were dealing with an ovarian abscess?



DR. GRAD.—By the physical findings it was the only thing it could have been. There was a distinct fluctuating mass at the site of the ovary.

DR. WARD.—Where do you think the infection came from? Do you consider that it could have been in the ovary?

DR. GRAD.—There was no way of telling that, but I thought that the infection might have been in the ovary.

DR. VINEBERG.—In a paper which the Mayos published in reference to the conservation of the menstrual function, a singular statement is made, namely that there is less atrophy of the vagina when the cervix is removed with the uterus than when the cervix is left. I remove the cervix in most cases. I merely mention it to draw attention to it because it seems a rather strange statement and one worthy of future observation.

DR. MEYER R. ROBINSON.—That the ovarian function is essential to the physical and psychical well being of women, particularly before the fortieth year, needs no further comment. This clinical truth is well established. Dr. Hawks' limited but careful observations tend to prove that patients in whom the ovaries have been retained after hysterectomy, suffer far less from the annoyances of the artificial menopause, than those, in whom this precaution has not been taken. Dr. Bailey's extensive citations from the literature lend further emphasis to this clinical fact. The opinion of most clinicians however is unanimous upon the fact, that the life of such ovaries at the best is from one to two years. How are we to further prolong the function of these organs? Dr. Matthews demonstrated upon the screen, the operative procedure that will preserve the ovarian circulation, and thereby insure a more prolonged period of ovarian life. It seems to me, that the ovarian innervation, is quite as essential to the proper functioning of the ovary, as is its circulation, and that unless we operate so that sufficient endometrium can be left behind, for purposes of menstruation, which necessarily implies that we do not invade the anastomosing areas between the uterine and the ovarian arteries, the ideal aimed at cannot be realized. It is therefore my rule, that in cases of single or multiple fibroids of the uterus requiring operation, I either do a myomectomy, or an excision of the tumor bearing area, preserving enough uterine tissue for menstrual purposes. If this is surgically impossible, a panhysterectomy is performed. In cases of bilateral chronic inflammation of the uterine adnexæ necessitating surgical intervention, no attempt is made at ovarian preservation, unless I can leave the uterus behind with the remaining ovary.

DR. FREDERICK C. HOLDEN.—The only objection in following the teachings of Tuffier, who says that the ovaries are of no use without the uterus, is the great annoyance in cases of atrophic vagina which sometimes follow a complete hysterectomy and bilateral oophorectomy. In younger women with fibroids, when it is possible I always do a myomectomy and thus preserve the menstrual function. I think it is a great mistake to let a woman know that her ovaries have been removed or to question her in regard to the menopause symptoms as such suggestions have a bad psychic influence. I make it a practice of immediately putting these women on ovarian extract for a period of one to two years, stating that it is given as a tonic, and in my opinion it very largely mitigates the otherwise annoying symptoms.

DR. HAWKS, in closing: The age of the patient was not considered except in ruling out those who had passed the natural menopause by several years. The majority were between the ages of thirty and forty-five. The extremes were twenty-five and fifty-one. Only those who were menstruating or who had recently stopped were studied as regards "flashes." The age made no difference in the occurrence of

the "flashes" in those patients who had not passed well beyond the menopause. We know little of the function of internal secretion of the ovary but the opinion is held that the ovary is active for at least five years after the cessation of menstruation. The fact is we do not know its value after the menopause and we should give the patient the benefit of the doubt. As to the ovary being dependent on menstruation we know that it is surely active before puberty and we can't say that the function is suspended during lactation. We cannot speak dogmatically of the "life history" of an ovary, either normal or retained, for we do not know the source of the internal secretion and cannot demonstrate the cells from which it comes. We cannot say this or that ovary is functioning or not. The most atrophic looking ovary may be giving off an internal secretion. The section from an ovary retained two years after hysterectomy shows a recent corpus luteum and apparently is quite active. Mayo mentions seeing healthy ovaries twenty years after vaginal hysterectomy.

To decide about retention of ovaries we have only to weigh the harm that may come from leaving them. We may have a disagreeable experience with the retained ovary or we may regret that we removed them. I recall very distinctly two cases of early toxic goiter which seemed to be hastened to fatal termination by hysterectomy and double oophorectomy. Until we know more of the function of internal secretion of the ovaries we may well leave them if possible unless we are satisfied that the retained ovary is a source of considerable serious harm.

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## THE NEW YORK OBSTETRICAL SOCIETY. MEETING HELD JANUARY 11, 1921.

DR. FRANK R. OASTLER IN THE CHAIR

DR. ALBERT M. JUDD presented a report of cases of **Adherent Placenta, Congenital Absence of the Rectum, and Congenital Malformation of External Genitals.**

CASE 1.—Mrs. J. P., para iii, admitted to the Beth Moses Hospital, November 14, 1920, with the history that membranes had ruptured five days previously, and patient had been in active labor for 24 hours.

*Examination.*—Shows a woman in a state of marked exhaustion, temperature 100.4° F., pulse 140, small and thready, dry tongue, extremely restless, complaining of continual pain, uterus in a state of tonic contraction, with distinct thinning of the lower uterine segment, and formation of retraction ring at level of the umbilicus, child in transverse position, head in left iliac fossa, right arm prolapsed in the vagina. Fetal heart, faint and irregular, rate 172, heard to the right and at the level of the umbilicus. Meconium discharging freely from the vagina.

Taken to delivery room. Ether anesthesia. A rather difficult version and extraction performed. Baby in a condition of asphyxia pallida. Feeble cardiac impulse felt, but soon ceased. Failing to deliver the placenta after 1½ hours' waiting, patient returned to bed, general condition fair, pulse 138, no bleeding, uterus tonically contracted. On the next day the patient suffered a great deal of pain in lower abdomen, in the median line and towards the right side. Uterus felt at level of umbilicus, very tender to touch. No peritoneal reaction, no muscular rigidity, moderate degree of paresis of gastrointestinal tract, as evidenced by repeated vomiting and abdominal distention. Very little bleeding present.

On the afternoon of Nov. 17, for the first time since delivery, abdominal examina-

tion disclosed a slight relaxation of the uterus, accompanied by the expulsion of two large blood clots per vagina. Slight degree of icterus present.

A moderate, very offensive vaginal discharge, required isolation of the patient. At 8 P.M. same day, a large mass of placental tissue appeared at the vulva. Very foul, putrid odor.

Nov. 19. Taken to operating room—tissue at the vulva removed—finger separation of large quantity of tissue which was found plastered along the left uterine wall, from a short distance above the internal os, up to and including the left cornu of the uterus. There was no line of demarcation between placenta and the uterus, and only the tissue that came directly away with the finger and the gauze covered sponge stick was removed. This was very soft and friable, black in color and very putrid, and the finger felt the soft placental tissue intimately adherent to the uterine wall, and this was left undisturbed.

At no time had there been any marked bleeding from the uterus, either before delivery or after. One hour after patient was taken back to bed, she had a severe chill with rise of temperature to 104.4°. On the next day general improvement noticed, absence of local tenderness, profuse discharge from the vagina, with very offensive odor. On November 23, patient developed a pulmonary embolus in base of right lung posteriorly, which cleared up after 7 days.

For next two weeks, patient continued an irregular intermittent temperature. No complaints subjectively. Abdominal examination negative as to pain or peritoneal involvement. Profuse purulent, putrid discharge from vagina.

*Examination.*—Dec. 3, 1920 (twentieth day postpartum), cervix bilateral laceration, with external os wide open. Fundus cannot be mapped out, because of an irregular hard mass, occupying the posterior fornix, and extending slightly in both lateral fornices. Retains an impression made by the examining finger. Under repeated enemata, and digital evacuation, impacted feces in lower bowel cleaned out. The temperature throughout was of an irregular intermittent type ranging from 100° to 104° lasting for 24 days. Patient had one chill, which occurred an hour after intrauterine manipulation.

The interesting features of this case are: (1) The neglected transverse presentation, with threatening rupture of the uterus. (2) A true adherent placenta, left undisturbed for 4 days, at which time there was evidence of its being broken down, and extrusion in part from the uterus. (3) A digital removal of this sloughing tissue on the fifth day. The tissue removed was but the superficial portion of the placenta which had broken down. The main basal portion was intimately adherent to the uterus, disclosing no point of separation or demarcation. (4) The development of a putrid endometritis and accompanying toxemia, and absence of any cellular or peritoneal involvement. (5) Despite daily bowel evacuations, the development of a condition of fecal impaction. Forty-eight hours after the lower bowels had been thoroughly cleaned out, the temperature dropped to 100° for the first time and 36 hours later reached normal. (6) And finally a consideration of the procedure employed. After waiting 4 days, at which time there were now distinct evidences of breaking down and expulsion of the placenta tissue, should one have let the patient alone, depending upon Nature to bring about the separation and expulsion of the adherent placenta?

CASE 2.—C. H., age 24, para i, King's County Hospital #10426 (1920) was admitted to the Obstetrical Service, November 16, 1920, at 4:30 A.M., with the history of a spontaneous delivery at term of a living child. The placenta had not followed in the usual interval and there occurred a sharp hemorrhage which was not controlled by pituitrin, neither could the placenta be expressed. There was no history obtain-



able of intrauterine manipulation. En route to the hospital there was another hemorrhage and the patient's condition was serious. During the administration of a hypodermic of morphine, the needle was broken, part of it remaining in the patient's arm. On admission she was extremely weak, with an almost imperceptible radial pulse, respiration of 28, and temperature of 97° F., presenting the picture of acute anemia.

The previous history was negative except for an attack of influenza two years previous, and slight comenstrual pain, the pregnancy having been uneventful throughout.

At this time the treatment consisted solely of measures to combat the acute anemia, and failing to accomplish the placental delivery by expression it was deemed best for the present to let it alone. A tight abdominal binder was applied and small doses of ergot given, controlling the bleeding. Catheterized specimen of urine showed specific gravity of 1.020, reaction acid, marked trace of albumin and many hyaline and granular casts. A blood count showed 2,760,000 red cells; hemoglobin 48 per cent. Temperature on day of admission was 100° F. and pulse still too feeble to perceive at the wrist.

On November 17 the temperature had risen to 102° F. with placenta still retained and expression unsuccessful though bleeding was now controlled except for slight oozing. On November 18 temperature was 104° F. with patient in poor condition generally, hence it was decided to attempt removal of the placenta which was accomplished with little difficulty. The hand passed into the uterus grasped the placenta which was found adherent for an area of about five by two cm., and the fingers passing through the adhesions about the site of the left tubal orifice. Very slight bleeding attended this maneuver which was followed by an intrauterine douche of ½ per cent lysol. A transfusion by the citrate method was then done and about 250 c.c. given.

From this on, the patient ran the usual septic course. A second transfusion was done six days after the first and about the same amount of blood given, the blood count now showing 3,680,000 red cells and a hemoglobin of 60 per cent. Ten days after admission, or eight days after the placental removal, a blood culture showed a staphylococcus. Twelve days after admission, or four days after the last transfusion, the temperature reached normal though another culture during this afebrile period on December 1 still was positive. The blood cultures finally remained sterile on December 11. A slighter raise of temperature for a few days was found to be due to cystitis and yielded to urinary antiseptics.

The piece of hypodermic needle was removed under local anesthesia on December 13.

On discharge on December 17 the red cells were 4,000,000, hemoglobin 70 per cent. Patient felt well. There is a laceration of the pelvic floor as present on admission, and a bilateral laceration of the cervix; the uterus is normal in size, position and mobility. The right broad ligament is thickened at its base; the left fornix and cul-de-sac are negative. Breasts and nipples normal.

CASE 3.—Congenital absence of the rectum. Congenital malformations of the rectum and anus are not very rare but they usually take the form of an imperforate anus. In contradistinction to this, cases of absence of the rectum are quite infrequent. In a review of the literature, 38 cases of absence of the rectum have been reported in a period of 20 years.

Various types of operative procedures have been suggested for congenital absence of the rectum. Perineal incision alone has been done many times, attempting to bring down the lowest loop of intestine found. The difficulty, however, lies in the fact that in congenital absence of the rectum, no part of the intestinal tract is present in the pelvis.

The child here noted was born at home on the day before admission to the hospital.

Admitted May 19, 1920, discharged May 20, 1920, Hospital No. 61277. The diagnosis of imperforate anus had been made at home and a perineal incision made then was apparently unsuccessful since on admission the perineum was sutured.

*Operation*, May 19, 1920, Drs. Judd and Shann, laparotomy. A left rectus incision was made. The large bowel was found distended with meconium, and on tracing the splenic flexure down, it was found to end in a sac the size of a man's fist. The perineum was incised, the bowel pushed down, the posterior wall of the blind pouch was perforated with a blunt instrument and tacked to the skin with a number of fine interrupted silk sutures. The abdominal wound was closed in layers.

The child was in good condition on the following day, took sterile water without disturbance, and was sent home. When seen at home the baby remained in good condition, sutures were removed one week after the operation and the recovery was complete.

CASE 3.—Congenital malformation of the external genitalia. Mrs. E. S., para i, admitted to The Beth Moses Hospital December 6, 1920. Delivered spontaneously after normal 12 hour labor. Male child, weighing 6 pounds, 11 oz. Markedly asphyxiated and resuscitated with great difficulty after  $\frac{3}{4}$  of an hour. Asphyxia returning almost hourly. Baby died 36 hours after birth. During this time, heart sounds were poor and slow. No meconium was passed, neither was urine voided.

Immediately after birth, there was noticed midway between the penis and anal orifice, an appendage, somewhat livid in color, resembling a penis, with shining glans, and covered with an epithelial lining. No external orifice to indicate the presence of a canal running through its shaft. The anal orifice was an oblique cleft lined with skin and devoid of mucous membrane. On probing this cleft with soft catheter a canal was entered about 2 inches, beyond which it stopped. There were no other external malformations.

Autopsy performed Dec. 9, 1920. No malformations of head, eyes, nose, palate, upper and lower extremities. No spina bifida.

Posterior to scrotum at anoserotal junction, is a small pedunculated and elongated fibrous mass covered with epithelium, and at the base of which are numerous small papillary nodules. At the extremity of this pedunculated mass is a bulbous piece resembling a glans penis. The under surface of this "accessory penis" shows a median raphe which extends from the bulbous portion to the anus and is continued up into what is apparently the rectum. At what appears to be the ano-rectum, there is no mucous membrane visible. The testes are undescended. The liver and spleen are enlarged. The kidneys show polycystic formation on the external surfaces. The adrenals are markedly enlarged. The rectum is permeable. About an inch above the anal orifice is another leading into a diverticulum about 2 inches in length containing mucus and fused with the rectum, and, on the opposite side is another orifice in the mucosa apparently leading into a pouch.

The stomach shows multiple diverticula in the mucosa, appearing through the peritoneal coat as peculiar mottlings, which extend throughout the entire alimentary tract.

#### DISCUSSION

-DR. S. H. GEIST.—I would like to mention a case of adherent placenta with unique etiology. The patient was about 40 years, on whom Dr. Robert T. Frank did a myomectomy when she was about 41½ months pregnant. It was a rather large intramural tumor, the size of a grape fruit, and the enucleation carried him down to the decidua, but not through it. She did perfectly well and at term I delivered her. She had a perfectly normal, easy labor. I waited for the placenta for about two hours and after several attempts at Crede there was no apparent separation,

and after one-half hour I explored the uterus and found the placenta absolutely adherent along a longitudinal line and with a little difficulty I managed to separate it. On examination an area was found about 4 inches in diameter with a scar that extended almost through the fetal surface of the placenta. It corresponded, Dr. Frank afterwards told me, to the size of the length of his incision. It is possible that in the enucleation sufficient blood-supply was destroyed to cause a necrosis of the decidua and the fibrosis that resulted may or may not have extended into the placenta.

DR. HERMANN GRAD.—I would like to refer to a recent case in which the placenta was adherent on the right side and could not be removed. Finally I allowed it to remain and the next day put the patient under anesthesia and the placenta was removed. It proved to be not adherent. There was simply an irregular contraction in the uterus which retained it. In another case I was called to see a patient with a bad cardiac condition. She was confined and a diagnosis of adherent placenta was made. Removal of the placenta was attempted and finally it was broken off. When I got there about four hours later, examination showed an hourglass contraction and the major portion of the placenta was in the upper compartment. After relieving the contraction, it was very easily removed.

Dr. Grad stated, in answer to a question, that no pituitrin had been given.

DR. HAROLD BAILEY.—I can add a case of absence of the rectum which had some points of similarity to the case of Dr. Judd's. Four years ago a male baby was born on the Manhattan service, who had apparently a complete absence of the rectum. There was no dimple in the perineum. As I found no gut on perineal incision, I decided to open the abdomen by a left rectus border incision. After cutting into the upper part of the sigmoid, exploration with the finger showed that the sigmoid ended in a blind pouch about the level of the promontory of the sacrum. I estimated the diameter of this pouch to be 4 centimeters, and the assistant's finger placed in the wound below had no immediate relation to this pouch. I then did a permanent colostomy and the baby did very well and left the hospital in 20 days. It grew fat and apparently was a normal child in every other respect, and when it was about 3 months old I had it sent to a general hospital service for x-ray pictures with the instillation of collargol. After staying on this service for some time the surgeon in charge decided that it was best to attempt to make a rectum. What they actually did was to push a probe or director bluntly through from this pouch and it entered the bladder and after a few days the baby died.

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In a **Symposium on Operative Delivery vs. Spontaneous Delivery** the following introductory remarks to the discussion were presented: (1) **Cesarean Section** by Dr. O. P. Humpstone, Brooklyn, N. Y. (2) **Version** by Dr. John O. Polak, Brooklyn, N. Y. (3) **Forceps and Episiotomy** by Charles G. Child, Jr., New York, N. Y. (4) **Enforced First Stage** by Franklin A. Dorman, New York, N. Y.

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### Cesarean Section vs. Spontaneous Delivery

BY O. PAUL HUMPTONE, M.D., F.A.C.S., BROOKLYN, N. Y.

Apprehension lest one be considered a dangerous radical rather than a sane progressive makes me reluctant to champion the subject of cesarean section vs. spontaneous delivery in a symposium before this society. One cannot be precise since the



subject is ambiguous. No one would choose cesarean in any case in which the primary purpose of childbirth could surely be fulfilled by spontaneous delivery.

However, the old idea that childbirth is limited to a process of expulsion or extraction of a child from a uterus in a woman's abdomen by way of the narrow tortuous canal of the human pelvis; by the forces of nature alone, or with the aid of man stretching or tearing or cutting the soft parts or even severing the pelvis itself, has passed away in the light of aseptic abdominal surgery. Today no man is a competent obstetric specialist who is not a trained abdominal surgeon as well as a qualified pelvic operator. Herein lies a responsibility which should keep obstetrics and gynecology together as one specialty.

Both the fear and the glamor of cesarean section have disappeared from the minds of the laity. They accept it graciously and without alarm. Normal women come to us demanding a cesarean delivery to avoid the agonies of childbirth. While none would grant them this request, it is well to remember that what is a fantasy today may be a fact tomorrow.

Hysterotomy is one of the simplest abdominal operations that is performed, in primary cases at least, and should not have a mortality in properly elected and managed cases over any other clean abdominal surgery.

It is the easiest way for any primiparous woman to have her baby; and it is the surest way of having a live baby. It is the only painless childbirth that occurs today.

It gives the baby its just right in the contract, upholding the tenets of the church and the fundamental principle of our practice. No man can hold himself absolutely blameless these days, when after a long trying instrumental birth the baby is born dead. He will always remember that there was a time in that confinement when the baby could have been born alive, and in the retrospect, the mother have been left far less traumatized. Indeed we have all regretted that we have not done a cesarean in certain cases, but I have yet to regret one that I have done.

The German idea of the first labor being a test labor with disregard of the rights of the child should be abandoned.

However, while all these facts favor cesarean section *per se*, it has its distinct drawbacks. Chief of these are, in my opinion, the difficulty of an accurate appreciation of when it should be employed; the danger of its employment in unsuitable cases.

Technically so easy, surgeons without obstetric judgment perform this operation repeatedly in the presence of contraindication which make the trained obstetric surgeon gasp at their foolhardiness.

Cesarean has no place in the neglected case, long in labor, frequently examined by vagina, even though with gloved hands; notwithstanding the fact that the baby is alive, and evident dystocia exists. It is too late. The danger to the mother is too great. The responsibility for this child is not on us but on the present diagnostic disability of the men and women who do most of the obstetrics.

Porro cesarean, save only in the very exceptional case, puts too much value on the baby and not enough on the rights of the mother, that she shall be traumatized as little as possible. I heartily agree that too many uteri have been sacrificed under the supposition of a possible infection. Beck's statistics for his low operation may point the way for a safe suprapubic delivery in such cases, but I fear that most obstetricians must keep to "the art" of delivering them from below, as the safest way out of a bad dilemma.

While length of labor, particularly with ruptured membranes has some considerable bearing as a contraindication, it is slight compared to frequent vaginal examination, over a period of time. We look upon rectal examination as the greatest asset in widening the margin of safety in cesarean section.

The dictum of Craigin still holds for the most part, "once a cesarean always a

cesarean." While spontaneous births have often occurred following cesarean sections without rupture of the scar, I always feel and tell the patient that the first cesarean marks her for a cesarean family. This in my opinion limits her to a family of three children, a dogmatic opinion possibly, since many cesarean families are larger. However, the increasing abdominal adhesions with each operation which as yet we have found no way of overcoming, render the operation distinctly more hazardous with each succeeding birth. This and the weakening of the uterine muscle by repeated incision have led me to advise tubal sterilization after three cesareans.

What then are the requirements which we consider essential to a decision for cesarean section as against spontaneous delivery in the presence of comparative dystocia.

We should have a woman who has in her pregnancy been recognized as a possible cesarean by suitable physical examination; by pelvic measurements; study of the size of the fetal ovoid; presentation; general physical condition, particularly signs of endocrine disturbances that suggest poor uterine contractions. A woman who has been warned against any vaginal invasion in the last month of pregnancy by copulation, douching, vaginal examinations by anyone, including herself. A woman who is allowed to go into labor in a natural way (we believe induction of labor for dystocia obsolete) and allowed to continue in labor so long as progress is shown by continued dilation of the cervix, and engagement and descent of the presenting part. When after a test of 8 or 12 hours these conditions fail to develop, which facts can always be determined by rectal examination, then is the time to elect a suprapubic delivery. It would seem needless to add that if the arrest does not occur till the os is fully dilated or dilatable, the membranes ruptured, and the head in the midpelvis, then delivery should be from below, except in the case of a funnel pelvis.

The above statements apply to either an anterior or posterior position of the head, and we are speaking of primiparae or multipara who have lost their previous babies in difficult births from below.

Oversized fetus in a multipara who has had living children by the pitfalls of multiple pregnancy, hydramnios with monsters, and the many other factors which make engagement so often unattained in a multipara, point to interference from below.

Breech presentation in an elderly primipara over 35 or in any case in which for any reason there is an unusual value to be set on this child must sometimes be considered.

Prolapse of the cord in a primipara with unprepared soft parts is another indication which comes well within our discussion.

Previous extensive plastic pelvic repair followed by pregnancy, occasionally calls for a decision of this kind. Advanced cancer of the cervix is an absolute indication. Central placenta previa, in any case in which the diagnosis has been made before complete dilatation of the cervix, comes into the class of absolute indication rather than the debatable cases we are considering. Continued experience with uncontrollable bleeding, extensive tears, and rupture of the uterus, and sepsis should have taught us that the lower zone of the uterus should remain absolutely quiescent in the management of this condition. We would feel, however, that in the absence of active hemorrhage these cases may well be watched in bed in a hospital till the child is viable, always ready for an emergency cesarean.

In eclampsia, accepting the theory that the primary focus is in the uterus, and believing that the convulsions are materially controlled by emptying the uterus, we always surgically empty the uterus in the absence of labor, employing the abdominal route where the woman is over 8 months pregnant and the baby is alive.

In toxemia which is not responding to eliminative treatment and threatening symptoms develop we feel the same way. Cerebral hemorrhage may be anticipated and

permanent destruction of liver and kidney tissue avoided by prompt surgical intervention.

There remains one other class of cases for consideration. Asthenia occurring in heart disease, advanced tuberculosis, and chorea gravidarum, which sometimes come up for consideration in the interest of both mother and child.

I have briefly analyzed the elective cesareans that I have done in the last year. In 653 private cases I performed 23 elective cesareans, 15 were in primiparæ and 8 in multiparæ. In the primiparæ the indications were as follows: 8 disproportion after test of labor from 8 to 34 hours; 2 pre-eclampsies at term; 1 pre-eclampsie with central placenta previa at 8 months; 1 funnel pelvis with test of labor, head jammed in mid-pelvis, full dilation; 1 dystocia from previous Gilliam operation; 1 asthenia from chorea gravidarum with mitral stenosis and tuberculosis; 1 multiple fibroid in an elderly primipara who had frequently been advised hysterectomy.

Of the 8 multiparæ 5 were second cesareans; 1 was for central placenta previa after 2 dead babies in the presence of placenta previa previously; 1 for dystocia from previous fixation of the uterus; 1 after 1 dead baby by forceps, disproportion test of labor for 8 hours; 1 mother died, a second cesarean, a preventable death. Too much bleeding occurred at time of operation from a complication of adhesions. She died of delayed shock coming on 4 hours after operation. She should have been transfused at once after operation. There was no fetal mortality.

*Conclusions.*—First: cesarean section has a place for consideration as against spontaneous delivery.

Second: its chief dangers, both to the standing of the operation and the interests of the patient, lie in a lack of appreciation as to when it should be employed.

Third: certain conditions of previous study and management of the case are absolutely necessary to its rational employment.

Fourth: the following conditions may offer indications for cesarean vs. spontaneous delivery: Disproportion after test of labor; breech presentation in an elderly primipara; prolapse of the cord in a primiparous woman; with unprepared soft parts; previous extensive plastic pelvic repair; central placenta previa; eclampsia in the 8th or 9th month; pre-eclampsie toxemia in the 8th or 9th month; asthenia from various causes.

## Forceps and Episiotomy

BY CHARLES G. CHILD, JR.

The first, and, I think I may say without contradiction, the all-important, point in the consideration of forceps is to decide when to apply them. How to apply them does not enter into the scope of this paper, but I should like to emphasize the fact that their application when properly indicated, is not nearly so difficult as is often supposed. The really difficult forceps cases are usually those where the propriety of their use is open to question. When indicated, they are of the greatest value, but their use when contraindicated, may not only greatly complicate the case, but will many times prove disastrous to either the baby, the mother, or both.

Undoubtedly forceps are to-day used too often and too early, just as in the past they were not used often enough and too late. To decide with greater certainty when to apply instruments, is to my mind one of the most important points that obstetrics has to determine.

*Indications.*—These may properly be divided into two classes: 1. Indications on the part of the mother. 2. Indications on the part of the child.

*Mother:* (a) Undue prolongation of labor always affects the mother unfavorably, causing complications that may be either primary or secondary. A gradually rising temperature and pulse during the progress of labor is a pretty certain indication that



the individual is not playing the game as she should. It is a safe rule to take the temperature and pulse every hour from the onset to the termination of labor.

While true exhaustion of the mother may, in its beginning, be an indication for the use of forceps, a mere tiring from want of sleep, proper encouragement, or a poor morale, seldom if ever, is an indication for their use.

(b) When the second stage in anterior vertex, or frank breech presentations lasts more than two hours.

(c) When signs of a threatened rupture of the uterus appear and a rapid delivery becomes necessary, forceps may be the method of choice.

(d) Urgent indications to terminate labor are often presented by the general conditions of the mother, where prolonged labor might threaten life, as in certain cardiac conditions, pulmonary diseases, typhoid fever, eclampsia, and the like; where it is generally highly desirable to shorten the second stage of labor as much as possible.

The use of forceps as a means of rotating occiput posterior positions and forceps to the aftercoming head in breech deliveries, may at times be indicated, but should only be carried out by an operator possessed of the greatest obstetrical skill.

*The Child:* (a) Just as the temperature and the pulse of the mother is a most valuable guide as to the manner in which she is standing the progress of labor, the fetal heart of the baby is an all-important criterion of its condition and should be carefully listened to and frequently counted. An abnormally low or high rate of beat indicates beginning distress on the part of the baby, while a slow distant beat succeeding a rapid one is usually an indication to interfere. When the fetal heart cannot be heard directly after the subsidence of a pain, though it may reappear before the onset of the next one, as little time should be lost as possible in ending the labor.

(b) The appearance of meconium between pains is usually an indication of exhaustion on the part of the baby.

(c) A prolapsed, pulsating cord with fixation of the head is an indication for the use of forceps.

(d) A large caput denotes undue and prolonged pressure of the head and calls for a careful consideration of the advisability of a forceps termination of the labor.

*Requirements.*—Certain all-important conditions should be present before forceps should be applied, except in cases of dire emergencies: The bladder should be empty; the membrane should have ruptured; and the cervix should be fully dilated and paralyzed. It is wrong to apply forceps through an undilated cervix, using the fetal head as a dilator. Thorough paralysis of the cervix is of considerable importance and, where forceps are applied to the breech, it is of the greatest importance in preventing contraction of the cervix on the neck which causes many fetal deaths by interfering with the prompt delivery of the aftercoming head.

While it is true that the cervix may be fully dilated by manual methods, mechanical dilators are usually to be preferred and it is only by their use that the cervix can be effectually paralyzed.

Except in the rarest instances, the occiput should be anterior and the head should be fixed in the pelvic brim by its largest diameter.

*Episiotomy.*—When the presenting part of the child reaches the perineum the rôle assumed by the one in charge of the case, that up to this time may have been entirely passive, becomes more active. He now only too often urges the woman to redoubled efforts, and neglects to administer an anesthetic, fearing thereby to retard the pains and prolong the labor. As a result the patient's suffering is greatly increased, and her future usefulness in life is often impaired by a serious traumatism of the pelvic floor.

As the head approaches the perineum, the danger point in the stretching of the

levator muscle begins. Whether it will be equal to the situation and allow the birth of the child without sustaining permanent injury, is a question that can never be decided with certainty until after the birth has occurred. Many times the prolonged dilatation, where perineal stretching is unduly delayed, results in a paralysis of the muscle, or subcutaneous separation of its fibers, that is just as disastrous as their actual tearing would be, and gives rise to a condition often more difficult to correct subsequently than if it had actually been torn. Therefore, do not unnecessarily hold the head on the perineum with the idea of securing sufficient dilatation to prevent laceration. Many times a solution of continuity occurs that is not evident externally. I have seen the vaginal wall, the levator muscle, and even the sphincter muscle, torn completely without any laceration showing externally, and this has happened in cases where only moderate bulging was observed. In one case the membranes caused a second degree tear before the head reached the perineum.

When the head has advanced sufficiently to begin the separation of the vulva, is the time to open the vagina between pains, and as the head recedes, to inspect its walls carefully. Any tearing of the mucous membrane, even though slight, is an indication that such tear will, in all probability, later involve the deeper structures.

We have now a choice of two procedures for the preservation of the perineum: The first is the time honored one of holding back the head with each pain until we think that a sufficient degree of stretching has been obtained to allow its birth without laceration; the second is that of sufficiently enlarging the opening by an incision. The first method, I think you will agree with me, is more or less uncertain; the second, when properly performed, I believe, is much to be preferred.

The operation of episiotomy is an old one, but like many old things, often forgotten or derided. It is an operation well within the capability of the general practitioner. It shortens the perineal stage of labor, saves the perineum and many times, in breech deliveries, the life of the child as well. It converts a breech extraction in a primipara into as easy an affair as in a multipara,—if I may be allowed to use the word “easy” in conjunction with such a formidable subject as breech delivery.

The operation of episiotomy consists of enlarging the outlet of the birth canal by an incision made preferably with scissors. The site of the incision is on one side of the vulva, and should go through the skin, subcutaneous and adipose tissue, down to the levator muscle. The division of the muscle should be carried to a point just sufficient to allow the birth of the head. The extent is gauged as the head advances with each pain. The division of the fibers progresses hand in hand with the pressure of the head, until the proper point has been reached. In some primipara, in whom the introitus is too small, or the head too large, bilateral episiotomy may be necessary. In breech extractions, where plenty of room is so often necessary for the release of extended arms, or to incise a cervix that has contracted around the neck of the after-coming head, no chances should be taken with a small incision.

The suturing of the incision after delivery offers no particular difficulty. Interrupted silkworm-gut sutures are the best, and these should be passed deeply from without inwards, taking up all tissue as far as the vaginal mucosa. The latter is then united by a continuous suture of No. 2 chromic catgut. All sutures can be introduced while waiting for the expulsion of the placenta, with the patient still under the anesthetic, and their introduction is greatly facilitated by the placing of a medium sized laparotomy pad in the vagina to prevent obstruction of the field of operation by blood coming from the uterus. These sutures ought not be tied, however, until after the delivery of the placenta, for if it is adherent, a manual removal may be necessary.

Though many good authorities give episiotomy a low rating, I would strongly recommend it as a most valuable obstetrical operation.

## Enforced First Stage of Labor

BY FRANKLIN A. DORMAN

Several years ago a Fellow of this Society wrote an article on the operative treatment of labor. In this article he warmly advocated the use of the bag at term in certain cases, and claimed that thereby he reduced the number of his operative deliveries. Some of us, in discussion, pointed out the fact that the use of the bag was in itself an operative procedure.

With practically all of us, an enforced first stage of labor means the use of the cervical bag. Because of the other alternatives, first, the bougie, means quite probable early rupture of the membranes with the resulting dry labor; and secondly the cervical tampon is of indefinite efficacy and may not continue its preliminary effect. The bag, on the other hand, will in time induce uterine contractions with cervical dilatation; it will also serve as a tampon in cases of placenta previa, and, to some extent, as a substitute for the bag of waters in dry labor.

I would state my thesis as follows: that enforced first stage means induction of labor; that induction of labor means use of the cervical bag; and, lastly, that the employment of the bag constitutes an operative procedure,—one that is in itself of such serious possibilities that its adoption should be under the best indications.

The scope of this operation has covered a wide range of indications, many of which may occur any time during the course of pregnancy. We summarize them without entire endorsement, as: toxemias of pregnancy, insanity, chorea, placenta previa, accidental hemorrhage, endocarditis, deformities of the pelvis, induction before, at, or after term to avoid a relatively oversized child; before term to anticipate possible intrauterine death in cases of habitual stillbirth; in cases of dry labor; and in cases of intestinal obstruction.

The value of the bag in labor is well established. I venture to say that there are few who would care to practice obstetrics without it. However, methods or fashions of treatment change with experience. Some at first regard the bag as of wide application; later show clearly certain disadvantages which tend to limit its scope. Of late years, it has seemed to me that the induction of labor has appealed less often, that I have markedly limited its application. To verify this, I made a study of my private case records. For purposes of comparison, my first 500 cases, dating from the beginning of private practice in the fall of 1902, were contrasted with a later series of 500, to date. To my surprise, I found that the first series showed 85 inductions by bag, 1 by bougie; while in the last series there were only 25 bag introductions.

To answer the question which arose as to whether this change had affected statistics, a review of the first 500 cases demonstrated a stillbirth mortality of 6.8 per cent, while the last 500 cases gave a stillbirth mortality of 1.8 per cent, a difference of 5 per cent.

The early cases included a large percentage of consultations, many of them in tenement houses, while the present clientele is a much more stable one. Evidently, however, the figures have not been unfavorably affected by a diminished use of the bag.

Why has this conservatism in the induction of labor developed?

The answer is clearly given when we study the sequelæ of bag cases. In this series of 110 cases, there were 22 high forceps, 24 medium forceps, 6 low forceps, and 6 versions. In 18 cases it was necessary to complete dilatation by digital stretching. In 10 cases, a primary trachelorrhaphy had to be done. Five cases demanded tamponade of the uterus for hemorrhage postpartum. There were 9 stillbirths and 9 fetal deaths. Three of the inductions were failures. In another case the cervix had to be incised in order to complete delivery. The bag converted one vertex case into a breech. Labor was prolonged beyond 20 hours in 26 cases. The maternal morbidity of the series I am unable to present, but it must have been above normal.



Here then, is the indictment against the unnecessary use of bags. It is an operation which demands the most careful aseptic precautions, as it introduces into the uterus for a longer or a shorter period a foreign body which may later have to be replaced by another and larger body, and perhaps again by yet another. There is no definite rule in regard to the uterine response to the stimulus, which may be much delayed or transitory in its effect. I have more than once seen a cervix dilated to four fingers, close down to one finger in a few hours after the bag expulsion. In one case, the patient was having regular uterine contractions stimulated by pituitrin.

The labor that is induced is apt to be of a poor type, as shown by a large number of protracted cases. The final dilatation is often incomplete, without the proper thinning of the lower segment. The evidence of the frequent and serious operative deliveries clearly shows this.

Granting, then, the possible dangers of the use of the bag, it is important to get as clearly as possible in our minds the justifiable conditions for its employment, and to be able in a given case to determine when the importance of terminating pregnancy outweighs the disadvantage of a bag labor.

The commonest indication in our first 500 series was for overtime (?) gestations. This was found 29 times. In my last series, while it was still my most frequent indication, it was used only seven times. It is my increasing conviction that overtime babies are rarer than is commonly supposed, and that an element of the ready use of bags in these cases is the nervous strain associated with an anxious patient and exigent relatives. The frequency with which patients go three weeks past their apparent date and produce normal children should make us extremely careful of an arbitrary determination of term. It is my contention that a normal labor, even with a large infant, is apt to be safer than an induced one with a smaller child.

The next frequent indication in our first series was the deformed pelvis. This was found 17 times, and in this series I am convinced that I got my worst results. In my last series it was used twice. The theory here is that in the border-line cases preliminary diet, with a normal vigorous labor gives the best possible chance of success. In the extreme cases, a full term baby by cesarean section is indicated. Where a fair test of labor fails, the cesarean section is still a good resort.

In the toxemias of pregnancy, the enforced labor must be an occasional resort. My first series showed 11 cases; my last series, six. I fail to see how this indication can be much reduced, except by careful prenatal supervision, unless we are able in eclampsia to persuade ourselves to fall back entirely upon the morphine and expectant treatment.

Ruptured membranes without uterine pains have supplied a seductive lure for the use of bags. My early cases showed its use seven times; in my late series, four times. I believe that my next series will show very few, if any, dry labors induced. I quote from a recent study of cases of dry labor at the Woman's Hospital:

"The bags were used in 25 cases; in 11, the chief purpose was to induce labor; four special indications for induction were: eclampsia, toxie albuminuria, accidental hemorrhage, and placenta previa. In 14 cases dilatation was desired in cases already in labor; two of them had placenta previa. In all bag cases, the maternal morbidity was 32 per cent; the fetal mortality, 20 per cent. With dry labor the only indication, the morbidity was 26 per cent; fetal mortality, 21 per cent. In all cases of dry labor, morbidity 26 per cent, mortality, fetal, 8.5 per cent.

"In so far as the figures in so few cases can be used as an index, bags did not reduce the maternal morbidity and appeared unfavorable to the safety of the fetus. One prolapse of the cord occurred as a complication of the use of the bag, but did not cause stillbirth. The termination of the bag labors resulted in 44 per cent of operative deliveries, as compared with 28 per cent of all dry labors."

The further indications employed in our first series were: large child 4; placenta

previa, 3; for safety, that is patient in remote neighborhood or with history of previous rapid labor, 3; rigid cervix, 3; previous habitual intrauterine deaths, 2; endocarditis, 1; accidental hemorrhage, 1; intestinal obstruction and dead fetus, each 1. In the last series, there was one induction each for large child, rigid cervix, accidental hemorrhage, and dead fetus.

The enforced first stage is therefore in most cases a matter of the use of bags; its serious consequences are such that its undertaking should only be as the resort to a lesser evil. In the writer's experience it has decreased to about 5 per cent of his labors.

#### DISCUSSION ON SYMPOSIUM

DR. C. G. CHILD, JR.—I would like to suggest to Dr. Humpstone that he might enlarge the indications for cesarean section by the addition of that class of cases known as accidental or concealed hemorrhage.

DR. HAROLD BAILEY.—I would like to say a word in regard to the low trans-peritoneal cesarean. I regret that I was not able to be here when Dr. Beck read his paper at the last meeting. I have had experience with four cases only, but three of these cases were long in labor and had had a number of examinations, some of them outside the hospital, and one of them by a midwife. These cases all did well without any morbidity with two exceptions. Two cases that were operated late in labor had, one on the fifth day and one on the seventh day, a small fistulous opening about the middle of the wound which exuded a seropurulent material, but healed up within two or three days. Two of these cases had a more or less balancing or fixing of the uterus behind the symphysis. Not enough time has elapsed for me to know how serious a complication that is, but when they left the hospital (they have all been done since October) two of these cases had the uterus pretty well fixed behind the symphysis.

I feel that late cases can certainly be handled by this means, and especially after we have more experience in the technic, with greater safety than by delivery from below and with the probability or almost certainty of getting a living child.

DR. F. A. DORMAN.—I would like to ask Dr. Humpstone to make perfectly clear whether he has entirely abandoned the use of induction of labor in cases of toxemia or pre-eclamptic cases.

DR. J. C. EDGAR.—Dr. Humpstone brought out the requirements of a test of labor, with reference to contracted pelves, and I am very anxious to have him make clear the same point that Dr. Dorman has just referred to. I understood him to say that the induction of labor was an absolute indication. I could not subscribe to that for a moment for I believe we should give a test of labor more often in these cases. The beginning of pregnancy is an unknown quantity and the power of the uterine contractions is an unknown quantity in a given case. We used to hear some years ago a gentleman from Boston discussing the prognosis of labor, and he undertook to say that in a given case he could prognosticate the character of labor that a given woman would have and, secondly, if she had a relatively contracted pelvis that a given case would have strong labor pains and another one would be inclined to have inertia.

When he spoke of plastic vaginal operations I presume, of course, he included amputation of the cervix as formerly done. I am at the moment confronted with the confinement of a woman who has had a cervix amputation and I consider this as almost a positive indication for cesarean section.

DR. G. H. RYDER.—Did I understand Dr. Humpstone to say that eclampsia was often in itself an absolute indication for cesarean section? Of course, in eclamp-

sia with the old and tried methods of induction of labor, followed by natural delivery, or by accouchement forcé, or forceps delivery, good results were often obtained. I would like to know whether or not he means that we should discard these tried methods in eclampsia, and resort always to cesarean section. He also said that in placenta previa associated with long rigid cervixes not much dilated, where an early diagnosis is made, cesarean section is absolutely indicated. I would like to ask if in these cases after cesarean section, he gets much bleeding, and if so how he controls it.

DR. E. T. HULL.—It seems to me that we have had tonight an exposition of sane obstetrics in all of the discussions and in all of the papers, and it has been a pleasure to hear such an exposition after hearing about "habitual version" and various other things.

There is one point about the cervix upon which I would like to comment. A bag will not, unassisted, dilate and paralyze the cervix.

If you consider the hard forceps operations which you have done, you will find, I think, that it has rarely been bony obstruction or disproportion which has made the operation difficult, or which has given bad results, but it has been the obstruction by the cervix. You apply forceps and their irritation of the lower segment stimulates the uterus to contract. As soon as you get the forceps on and pull, the cervix will contract down again.

I would like to ask Dr. Child whether it is possible to dilate a cervix, either manually or instrumentally, in such a way that it will not contract down again. In other words, so that it is obliterated and paralyzed. The only way, in my belief, that a cervix could be obliterated is by normal labor pains, and you cannot do it either by manual dilatation, with bags, or by instrumental dilatation.

DR. WILLIAM PFEIFFER.—I am glad to hear Dr. Humpstone, in giving the indications for cesarean section in eclampsia, discard the old distinction between the multiparous and the primiparous woman. It was only very recently stated that the multiparous woman in eclampsia should not be sectioned. It seems to me it is the condition of the soft parts, whether it is the first or the fifth child, which is the determining factor in doing a section in eclampsia.

DR. O. P. HUMPTSTONE.—This paper was not on the absolute indications, such as absolutely contracted pelvis and tumors blocking the pelvis. It was a paper on the comparative indications between spontaneous delivery and cesarean section.

Dr. Dorman and Dr. Edgar both asked the question whether we induce labor in toxemia with bags. Of course, we induce labor, but not in dystocia. I said we consider the induction of labor for dystocia obsolete. We feel the woman should be allowed to go and be given a test of labor under necessary precautions and then do a cesarean before it is too late. Again, given a woman who has had a complete tear into the rectum which has been repaired and at the same time an amputation of the cervix and an anterior wall done; I think most of us would feel that rather than avoid the prolapse that existed before, it is safer and saner to do a cesarean; particularly if some ligamentous operation, such as a Gilliam operation, was done, which may occasionally cause a dystocia.

We do cesarean in eclampsia on cases which are not in labor, in the eighth and ninth month of pregnancy. I would not do a cesarean on a woman who is advancing rapidly and satisfactorily in labor in eclampsia.

As to bleeding in placenta previa: in the cases which I have done cesarean section in placenta previa I have never had any hemorrhage. I cannot conceive why such hemorrhage is not as controllable as any hemorrhage after cesarean section by



simply packing the vagina. In the cases in which bleeding took place after cesarean, the situation has been entirely controlled by packing the vagina and the use of pituitrin. We don't have to pack into the uterus. It is necessary to keep away from the lower zone of the uterus in placenta previa, if you want to keep out of trouble.

Dr. Pfeiffer referred to the woman in labor in eclampsia. We don't do cesarean to the woman in labor, but to the woman not in labor, in the eighth and ninth month of pregnancy.

I would like to say a word for central episiotomy or perineotomy. It has been my habit, since Dr. Pomeroy brought this out, to practice elective perineotomy on primiparae as a routine procedure, except in a very few cases. The advantage of it, in my opinion, is that you are working in the region between the two levators, and they are not torn in the procedure. We do a preliminary dilatation of the sphincter muscle, and if one cuts through the sphincter, there is nothing to fear. These cases have healed in my experience just the same as any other cases. We put two sutures through the levators, draw them together, and at the top of the triangular wound, on the inside, put a running stitch down to the edge of the skin, just outside of the hymen, and then catch the fascia over the levators. After they have been tied together, you continue with the same stitch subcutaneously and tie at the top. You cannot tell subsequently that the woman has had an incision in the perineum, and afterwards, unless one is careful, the patient will have a tighter perineum than she had before.

DR. J. C. EDGAR.—I am inclined to subscribe to Dr. Child's statement that forceps are used too often and too early.

The point just brought out by Dr. Humpstone I was waiting for Dr. Child to bring out, namely, central episiotomy. Where it is necessary to cut, the central line is the place to cut. It is a cleaner surgical procedure, the belly of the levator is not torn or cut, and the muscles are more intact than with incisions on the side. However, I sometimes make a lateral incision.

I think one of the most valuable points Dr. Child brought out is the pernicious results of holding back the head. Most of us have been guilty of that. I have been guilty of it, especially in private practice, where for some reason the labor is more precipitate or rapid than expected and in the anxiety of the nurse in trying to follow out what she considers the wishes of the doctor, she tries to keep the case for him, gives some chloroform and places a towel over the perineum. The head is thus sometimes held back one-half or three-quarters of an hour with chloroform, and during that time there may not be any visible rupture of the perineum or vagina, but, as after results indicate, there is no question but that there is a subcutaneous separation of the fibers of the levator.

I had quite a characteristic case sent to me from out of town, which was delivered by one of the doctors in this room here now. There wasn't a sign of any laceration. She had a second degree prolapse of the uterus, cystocele and rectocele after the first confinement. The head was held back the best part of an hour waiting for the attending physician. I also had such an experience last week, in which I could not criticize the nurse. I only had to take two stitches. I feel she is eventually going to suffer from the holding back of the head and the pounding, in spite of the chloroform that was given. It is unthinkable to allow the head to stay for any length of time on the pelvic floor because you get much more laceration than you would by forceps.

The thought has come to me in the last few years that the forceps can be improved upon as an instrument. If you will excuse the expression, I think it is more or less

of a "rotten" surgical instrument. We are constantly speaking of the proper application of the forceps or the adaptation of the forceps to the biparietal diameters and have taken no account at all of the size of the forceps as adapted to the size of the baby's head. We take up a pair of forceps and they are applied to a nine-pound baby or to a four-pound baby. We only carry one pair of forceps. I have felt for some time that there is a field here for someone to improve the instrument itself. Now, perhaps I am a little bit more conservative than I was years ago. There is no question that I applied forceps too often and too early, as has been said, and a good many of us have applied forceps too early and too often in the past. There is a wonderful strain of conservatism running through the discussion this evening which applies to the forceps as well as to the other methods, and the forceps to me simply tend to lacerate the outlet. They certainly do not adapt themselves properly to the fetal head. A gentleman came on here some time ago from Philadelphia who had an arrangement to do away with forceps, if it had only worked. He had a sucker, a large bicycle pump, and he exhausted the air in the head cup and if he could only have kept it on the baby's head, it would have been the ideal thing. I loaned him a manikin and some fetal cadavers to try it out on. It did not add to the diameters of the fetal head or the diameters of the breech. I have tried it out at the Bellevue service to the limit, but the trouble with it was that you could not get vacuum enough in the instrument without taking a piece of the baby's scalp with it. And then some Frenchman had an arrangement with tapes. If you could get those tapes over the baby's head, you had there a means that would not increase the diameters. I am trying to bring out the increased diameters produced by the forceps and the fact that the forceps do not adapt themselves to the diameters of the baby's head. These tapes were like one of those caps that we put on the babies' ears.

I think there is a field for improvement in the instrument and to bring out the point, that we have heard almost endlessly the last few years of the prophylactic use of forceps as a medium for standardizing labor, to make the treatment of labor a standardized process. That is unthinkable to me.

DR. G. W. KOSMAK.—I want to speak about central episiotomy. I do not think it is anatomically correct to do lateral episiotomy. You get extreme separation of the muscular fibers, it is very difficult to repair, and in some instances it is followed by a great deal of pain. I recall a case in which a lateral episiotomy was done, in which the healing process was accompanied by extremely painful and annoying sensations so as to make that woman's puerperal state a very miserable one.

I want to bring out what the previous speakers said in regard to central episiotomy. The operation is very much better, healing is better, and the final results are better than those you get with lateral episiotomy. Furthermore, you get more room and you get the room in the place where you need it.

DR. R. M. BEACH.—Regarding episiotomy, I have to take exception to what some of the men have said. I think that we must differentiate the type of case in which we use the median and that in which we use the lateral incision of the perineum.

I was quite enthusiastic over the median perineotomy until I got a third degree tear of the rectum, and in spite of what Dr. Humpstone has said, I do not care to get any more third degree tears that I can avoid.

I have formulated in my own mind pretty definitely the cases on which I use the median incision and those on which I use the lateral incision of the perineum.

I use the median incision in cases where the head is down to the pelvic floor, where the woman has a long perineal body, where the anal opening is well posterior. When such a perineal body becomes totally blanched and white from the pressure of the head, I think the median incision is perfectly safe. On the other hand, the

lateral is best adapted, I believe, to those cases in which we are dealing with a large and hard head, and, secondly, where we are dealing with a breech in a primipara with a liability to complications with the arms and the aftercoming head. In such cases we may get excited in getting the arms and the head out and a third degree tear results. Thirdly, I use it in impacted occipitoposteriors where you cannot rotate the head, where the uterine body has gripped the fetal body so firmly that you must deliver as an occipitoposterior. Fourthly, I use the lateral incision in those cases where the pubic arch is narrow, where the head fulcrums posteriorly, being forced nearer to the rectum and lastly, the lateral incision is preferable where the introitus is unusually small with a deficiency of vulvar tissue. I feel that in all these types of cases the lateral episiotomy is better than the central.

DR. HAROLD BAILEY.—Where median perineotomy is done as a routine it is quite a different matter, it seems to me, than where it is used in certain indicated cases. Where it is used as a routine, it is stated that there is a third degree tear or incision into the rectum in every twenty-eighth case. I would like to know what becomes of those women in their subsequent labors. Are they delivered from below, or do they have to fall into the class of indicated cesareans? Moreover, I believe that the contention of the "median perineotomists" that it is easier to sew up this tear, is fundamentally wrong. It is true that they can be sutured satisfactorily. However, there is a great proportion of these tears that extend, and it seems to me that the extending tear presents just as grave a situation as an ordinary tear without episiotomy or perineotomy.

Then, again, if this operation is indicated, it seems to me, that it is indicated for one reason and only one, and that is to save fetal life. Where the head stops at the perineal outlet and the pressure is great, the contention should be for the operation, that it saves long-continued pressure on the fetal head.

DR. F. A. DORMAN.—Today there is a constant appeal for the extension of the use of perineotomies or episiotomies. There is one argument for holding back the head; namely, to allow the doctor to get there only to perform his perineal section. I believe honestly that the present race of obstetricians is going to forget how to deliver a head over the perineum. I cannot predict when the perineum is going to tear in any given case, but I confidently believe in the great majority of my own cases that it is just as easy to sew up a slight laceration after labor as to repair an extensive incision, and sometimes there will be no tear to repair.

It is coming to the point where we are going to show no skill in the delivery of the aftercoming head. We are going to lay the perineum open and pull the baby out. That is not obstetrics. I don't mean to deprecate the proper perineotomy or belittle the lateral incision with a narrow pelvis and an enormous, hard head or in delivering a breech where it is necessary to carry the hand in, but it makes me impatient to hear about the routine splitting open of the pelvic floor to save the woman's future health, because I do not believe it is necessary.

DR. S. H. GEIST.—I would offer two theoretical objections to the median perineotomy. Dr. Pomeroy cuts through the sphincter ani, and apparently in many instances where it is not done, it tears through in the delivery. The advocates of the operation always insist on the fact that they get good results in sewing up the sphincter. It strikes me that the man doing the lateral operation will be just as enthusiastic about the final results of that operation and I see no reason why one should jeopardize the integrity of the sphincter.

Another objection is that you deliberately, when you cut through the sphincter, open up into the vagina a badly infected tract (the rectum), making the vagina and rectum one, a cloaca. While I do not think many of the men have reported bad



results from working in this infected canal, still I think it is a matter which deserves some further attention.

DR. W. S. SMITH.—I have seen Dr. Pomeroy do a good many central perineotomies. He does not do the operation on every primipara. I have never seen him cut the sphincter unless he was very certain that it was going to tear. He waits until there is a laceration of the vaginal mucous membrane before doing it.

Practically all these perineotomies are preceded by dilatation of the sphincter, so that if it is necessary to go through the sphincter the ends will be in sight and very easily repaired.

DR. CHARLES G. CHILD, JR.—With respect to the relative merits of the two operations, I would say that whereas neither one is better than the other for all cases, I feel, as I laid down in my paper, that lateral episiotomy is preferable in the great majority of cases.

I cannot subscribe to what Dr. Humpstone said about the median incision being less dangerous and being more desirable because it separated both of the levator muscles from their attachment, the very thing we want to avoid if possible. In episiotomy only one muscle is cut, and the attachment of the muscles in the median raphe is not interfered with in the least. The median incision runs in the line of direction of the sphincter muscle, which it is desirable to avoid. With episiotomy the sphincter muscle has never been, to my knowledge, torn because it is entirely out of the way as the labor advances, and it is, furthermore, very much easier of suture and very much more certain of union because it lies to one side well up out of the channel of lochial drainage. The median line incision lies in the gutter over which the lochia passes and it is more liable to become infected. The objection offered by Dr. Kosmak that episiotomy is not anatomically correct I feel is open to just criticism. I know of no reason why Dr. Kosmak and Dr. Dorman should both have had the unpleasant experience of pain and suffering on the part of the patient during the union in the episiotomy incision.

DR. J. C. EDGAR.—I was a little in doubt whether Dr. Dorman in his use of the term "enforced labor" by the use of de Ribes' bag, meant dilatation of the cervix plus induction of labor, or simply induction of labor.

DR. F. A. DORMAN.—Induction of labor and the enforced stage, both.

DR. J. C. EDGAR.—I agree with Dr. Dorman that the introduction of a bag is a surgical procedure and requires proper preparation of the vagina, for the reason that one is passing from an unclean area into a sterile cavity. The cervix should be properly exposed and the bag introduced by inspection, directly into the cervical canal.

I cannot understand the high fetal mortality in Dr. Dorman's series. We have been using bags for many years on the Bellevue Hospital and the Manhattan Hospital services and do not consider that the bag of itself with the proper technic adds at all to an unfavorable prognosis. At the same time we must bear in mind that the introduction of a de Ribes' bag is a surgical procedure, and if it carries with it such a high infant mortality, I cannot see why the old method of giving castor oil should not have a chance. Recently it has fallen into disfavor as many statements have been made regarding its unreliability. In the Bellevue service we had something like 45 per cent of cases in which it was successful. In induction of labor it is an absolutely safe procedure. If our statistics are true on the Bellevue Hospital service and we had 45 per cent of successes with castor oil, I think it is only fair to a woman, if you think she has a large child and she has not gone into labor, to give castor oil

a chance. Personally, I like to give a huge dose of castor oil after a full meal in the evening before digestion is complete.

I do not like to give one full dose of quinin. If you give quinin, I think it should be given in divided doses every half-hour until 10 or 12 grains are given. Some women are peculiarly susceptible to quinin, and it sometimes creates a good deal of systemic disturbance.

DR. G. H. RYDER.—I was very much pleased with what Dr. Dorman said about using bags less and less for the induction of labor. I know that I am now doing fewer inductions than when I first began to practice.

I think it is only fair to state that some of the bad results following the use of bags are due to the fact that the bags were not indicated. It is like using forceps when they are not indicated, using them too soon or in unsuitable cases. There are some cases in which we know bags are almost sure to succeed, and others in which we know they would have little chance of success. If we use them in cases where they are not indicated, we are going to have bad results. Where the cervix is only slightly dilated and is long and rigid, bags are not well indicated as a rule, and if they are used, the result is apt to be disappointing. Where the cervix is dilated two fingers and soft, with the fetal head well down in the pelvis, the use of bags is far more likely to succeed.

I think another point is this: The use of bags should never be persisted in if they do not start up labor pains, rather the attempt to induce labor should be given up temporarily. Failure to follow this rule is a great source of trouble, for which the bag is unjustly blamed. To illustrate: A bag is inserted to start labor. Labor fails to start, and the doctor becomes impatient, and takes the bag out and puts in a larger one or a bougie. Still labor does not start. Then the cervix is dilated manually, the membranes ruptured, and finally the labor ended with a version and breech extraction or a hard forceps operation. If the bag had been taken out at first when it was apparent that it was not doing any good, and the woman had been let alone, no harm would have been done by the bag, and labor would probably have started shortly after spontaneously.

So I think that before we condemn the dilating bag, we should remember that the bad results following its use are often due to the fact that it was improperly used or was even actually contraindicated.

## Book Review

**Operative Gynecology.**—By Harry Sturgeon Crossen, M.D., F.A.C.S., Associate Gynecologist, Barnes Hospital, and Associate in Gynecology, Washington University Medical School. New second revised edition. With 834 illustrations. C. V. Mosby Company, St. Louis, 1920.

Practitioners of gynecologic surgery appreciate full well the value of Crossen. It is devoted exclusively to operative treatment. It analyzes all the different operative procedures for every pathologic lesion referable to the pelvis and points out the best operative technic to select in each given case, stating fully the reasons for each selection. Individualization is always paramount. The 834 illustrations are indeed impressive and certainly instructive. The skeleton outline of the book appeals to the systematic student.

The chapter on retrodisplacements of the uterus is a masterpiece. How often do we hear an operator remark, "My operation will correct any form of retroversion"? Crossen gives in detail the operative technic, wonderfully illustrated, of some thirty operations for retrodisplacements of the uterus and points out that the "living pathology" of each case must be understood before the best operative procedure can be selected for that case. This, certainly, serves to impress the surgical student with the fact that a thorough understanding of pathologic anatomy is a prerequisite to surgical success.

Just as retroversion has been clarified, so has the subject of prolapsus uteri. Perhaps, there does not exist today a surgical subject so much talked about and so little understood as prolapse of the uterus and bladder. The mechanism of prolapse is clearly given, and what could be more important as regards its correction than a thorough appreciation of the causes? In his classification of operative measures for the cure of prolapse of the uterus and bladder, Crossen presents the following outline: 1. Future pregnancies eliminated. (A) Vaginal operations. (B) Abdominal operations. 2. Function of Pregnancy Preserved. (A) Abdominal Operations. (B) Vaginal Operations. 3. Special Complications. (A) Retrouterine Hernia. (B) Prolapse of Rectum and Sigmoid.

No thoughtful student with honest intentions can fail to grasp the rationale of this classification. It is the acme of individualization. In the succeeding sixty pages we have described in detail, with innumerable line drawings, the operative technic of the many and varied operations that have been devised for the cure of prolapse of the uterus and bladder.

There is perhaps no form of surgery more harassing than that dealing with fistula in general and vesico- and rectovaginal fistula in particular. It would seem that even Crossen has not given the subject of fistula sufficient descriptive space. Upon the accessibility of these fistula depends very largely the success of their closure and yet the illustrations do not show the exact location of the more tedious fistula. The Souchard incision, as recommended by Dr. G. G. Ward, of New York, in connection with the more inaccessible vesicovaginal fistula, is a procedure that is extremely helpful and should be more generally employed.

In dealing with the suspicious malignant growths of the cervix, Crossen evidently believes, and rightly, in excision of tissue for microscopic examination. Likewise, curettage of the uterine cavity is recommended in all cases of suspected cancer, but



the indiscriminate routine use of the curette is condemned. The mooted question again presents itself for discussion, viz.: Do such traumatic procedures in the presence of malignancy tend to cause the further spread of the cancerous growth? With the perfect technic recommended and the laboratory facilities at hand today for quick and reliable microscopic diagnosis, biopsy is, it would seem, a perfectly justifiable procedure.

Various operations upon the cervix are described and beautifully illustrated. However, issue must be taken with the author when he recommends curettage of the cervical canal, trachelorrhaphy or low amputation for the cure of intractable chronic endocervicitis. I am certain that we have a far better procedure from every standpoint in the "cone operation" or excision of the cervical mucosa as recommended by Sturmdorf and elaborated by Matthews. In this operation the focus of infection is removed, therefore, the leucorrhea is relieved. Furthermore, neither the contour or the "holding power" of the cervix is materially interfered with.

The chapter dealing with the operative treatment of uterine fibromyomata is well nigh perfect in every detail. The technic of complete panhysterectomy with full technical details as to the handling of the cervix and closing of vaginal canal is certainly praiseworthy.

Nowhere, perhaps, can one find a better dissertation upon the conservative surgery of the ovaries and tubes than is depicted in Crossen. Auto- and heterotransplantation of the ovaries, a subject of vital interest, has been treated in a very enlightening manner. All the available literature has been reviewed, sifted, classified, and properly arranged in order to bring this subject up to date.

Operative treatment is required for a number of conditions affecting the vagina and external genitals, and instead of passing lightly over these minor gynecologic procedures, Crossen presents to us the technic for operations on the urethra for incontinence, the various hymen operations, those on Bartholin glands, the correction of vaginal stenosis and atresia by the best modern methods, the radical relief of absence of the vagina and those procedures applicable for the relief of dysmenorrhea and sterility.

For the gynecologic apprentice, the last 110 pages of Crossen are well worth memorizing for the sake of convenience, if not for practical purposes. Nowhere, perhaps, could one find more "horse sense to the square inch." Information is given here that if followed would make the patient more grateful and the surgeon more contented with his results.

In conclusion it must be said that one cannot fail to profit by reading this volume by Crossen. It appeals; it satisfies; it delights. The essential description is given in clear-cut word pictures and it depicts operative technic with honest drawings. The work should commend itself alike to the undergraduate student, the gynecologist, and the surgeon.

HARVEY B. MATTHEWS, M.D., BROOKLYN.

# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Selected Abstracts

### General Problems of Obstetrics

**Registrar-General's Report: Puerperal Mortality in 1919.** British Medical Journal, 1921. No. 3140, p. 354.

The statistics from the Registrar-General's report for England and Wales in regard to puerperal mortality are rather disheartening and somewhat humiliating. Deaths assigned to pregnancy and childbirth in 1919 were 3028 which is about 4.37 per 1000 births. Deducting 176 cases under the classification of puerperal nephritis and albuminuria, which were not so classified in 1910, it reduces the rate to 4.012 per 1000 births. The average rate for the preceding ten years was 3.74. The increase is mainly due to infection. In 1919 the rate of infections was 1.76 per 1000 births which was the highest rate since 1905 when it was 1.87. In 1918 the mortality rate from all causes was 3.55; from sepsis 1.35, the lowest rate on record except for 1913 when the death from sepsis was 1.34.

The Registrar-General divides the deaths into two groups: Group I—contains 3028 deaths and includes deaths due to pregnancy and childbirth such as puerperal infection and the accidents of childbirth. Group II consists of 1337 deaths due to causes which are associated with pregnancy and childbirth.

Group I is subdivided into: (a) Conditions existing during pregnancy which could be so dealt with that maternal deaths would rarely occur. In this series there were: contracted pelvis 47; craniotomy 9; malpresentation 12; hydatid mole 6; retroversion of gravid uterus 6; (b) Sudden or unexpected accidents: abortions 121; ectopic gestation 73; placenta prævia 169; hemorrhage with pregnancy 43; rupture of uterus 20; inertia uteri 7; abnormal fetus 9; difficult or prolonged labor 44; (c) Toxemia of pregnancy: uncontrollable vomiting 28; puerperal nephritis and uremia 131; puerperal albuminuria and Bright's disease 44; puerperal convulsions 420; (d) Puerperal fever: phlegmasia dolens 51. Total number of cases under this classification 1208. Puerperal embolism and sudden death 179. Nearly all cases of puerperal fever should be preventable.

Group II is subdivided into: (a) Conditions usually acute when complicating pregnancy and childbirth: Influenza 585, Lobar pneumonia 76, Bronchial pneumonia 34, Scarlet fever 10, Appendicitis 10, Intestinal obstruction 10, Acute phthisis 13, Enteric fever 3; (b) Pre-existing conditions usually chronic: Heart disease 177, Pulmonary tuberculosis 66, Bright's disease 37, Anemia 21, Epilepsy 8, Syphilis 7, Cancer 6, Diabetes 6.

If the cases of group II "1337 deaths not classed as due to pregnancy and childbearing, but returned as associated therewith" are added to group I the mortality rate actually amounts to 6.3 per 1000 births.

Probably 70 per cent of the midwifery of the country is in the hands of midwives. The midwives are well instructed and their work is carefully inspected and supervised. They should be in touch with qualified practitioners and must have seen women delivered by experts in fully equipped lying-in wards. They should be familiar with the minor operations, version, forceps, etc., performed in their presence by skilled teachers. They should have opportunities for personal experience.

Obstetrics is a specialty which cannot be in the hands of the few because emergencies may arise suddenly and it may be impossible to secure consultation quickly enough to be of any value. There are real difficulties in converting a poor bedroom loaded with furniture and miscellaneous objects into an antiseptic lying-in room. Yet the provision for the institutional care of maternity cases is entirely inadequate.

"If antenatal supervision were universally adopted, and complications anticipated, and if there were a more definite linking up of patient with midwife, doctor and hospital, the incidence not only of infection but of all other accidents of pregnancy and childbirth would be greatly diminished, and puerperal mortality and morbidity would continue to decrease."

F. L. ADAIR.

**Purdy: Maternal Mortality in Childbirth.** The Medical Journal of Australia, 1921, i, 39.

The author deals extensively with the subject as it exists today, especially in Australia, from the administrative and preventive point of view. The article includes several excellent charts showing the incidence as well as rise and fall from year to year of puerperal sepsis as a cause of maternal mortality in Australia.

In considering the decline of birth rate he notes the interesting fact that in the metropolis of Sidney, where 41.5 per cent of the population of New South Wales is located, the birth rate in 1888 was 41.09 per cent, while in 1919 it had fallen to 23.05 per cent of the population. This rate is 14 per cent below the average of the preceding five years, and the lowest on record. The main factor in the reduction of the birth rate is intentional restriction.

He also brings out the fact that the general infantile mortality of Sidney showed a marked decrease but without appreciable decrease in the death rate for the first month of life. Of the 1,175 infants who died in Sidney in 1918, 59 per cent died from prematurity and developmental diseases. Under this last heading he includes injuries at birth, debility at birth, atelectasis, congenital defects, atrophy, marasmus and dentition. Some of these causes were due to conditions operating at or before the birth of the infant. Syphilis especially being recognized as a common cause of premature birth and stillbirth. He further emphasizes that it is uncertain to what extent deaths registered as atrophy, marasmus, and debility are due to syphilis from antenatal infection, congenital causes or the lack of adequate care soon after birth.

The maternal mortality in Australia in 1918 showed that 592 mothers died from puerperal causes. Thirty-two per cent of the total mortality



in childbearing was due to infections at childbirth, eclampsia and renal disease causing approximately 22 per cent of the mortality. He believes that a larger part of the mortality and a still greater amount of subsequent associated sickness could be prevented, if adequate antenatal care and skillful attendance under satisfactory conditions at and after birth were made available.

The author urges adoption of the midwives act, which he discusses fully, as a means toward reducing both infantile and maternal death rate.

It was estimated that medical assistance was obtained in approximately 12 per cent of the cases delivered annually, in 7.4 per cent in the interest of the mother, and 4.6 per cent on behalf of the child. Interesting in this connection is the fact that the average percentage of the cases, in which medical aid is sought by midwives, rises proportionately to the increase in knowledge of the midwives.

NORMAN F. MILLER.

**McIlwraith: Obstetrics and the State.** Canadian Medical Association Journal, 1920, x, 305.

Although 75 per cent of women are delivered by midwives, there has been a gradual decrease of the maternal death rate in England, Scotland and Wales since the enactment of the Midwife Act and the Health Insurance Act, both of which are administered by the Ministry of Health. At present, there are 3.69 maternal deaths for every thousand live births. Of these, 1.44 are due to sepsis. In Ontario the rate has remained about the same for some years, namely 5.4 per 1000, of which 1.88 or 35 per cent are due to sepsis. This is given as an example of what can be done by proper legislation which must be preceded by the education of both profession and laity along these lines. Similar beneficial results have been obtained in other countries by years of sane laws.

However, legislation may be carried to extremes. Lately Lloyd George has been importuned to use his influence to have the state supply twilight sleep to the poor. Also, it has been found that too much paternalism on the part of the state breeds indolence on the part of the people. Or, it may be carried to such extremes as in Bolschevik countries, where the state assumes complete control of the child.

McIlwraith thinks the most potent causes of maternal mortality are, first, meddlesome midwifery, especially injudicious forceps application, lack of regard for asepsis and the performing of obstetrical operations under unfavorable surroundings and, second, the lack of appreciation on the part of the public of the dangers incident to childbirth which causes it to regard our efforts as mere ostentation.

R. E. WOBUS.

**Calderon: Obstetrics and its Relation to Infantile Mortality.** The Philippine Journal of Science, 1920, xvii, 19.

After recounting the dangers to both fetus and newborn from the lack of proper obstetric service, Calderon proposes such measures as would, in his opinion, best alleviate this deficiency in the Philippines. He proposes the establishment of provincial hospitals with out-patient maternity services. In such places where there is already a sufficient number of doctors and nurses, he advocates the organization of ma-

ternity services at once. Furthermore, he would have a commission discuss ways and means of making the practice of medicine more attractive to young men, there being, at present, only one doctor to 11,175 of the population, and these few physicians are by no means equally distributed over the islands. R. E. WOBUS.

**Howard: The Real Risk-Rate of Death to Mothers from Causes Connected with Childbirth.** *American Journal of Hygiene*, 1921, i, 197.

Based upon the total figures from the birth registration area of the United States for the year 1918, Howard finds that for every 10,000 births and stillbirths, there occur 88.48 maternal deaths due to causes incident to pregnancy and childbirth. In England and Wales the maternal death rate is only 40.31 per 10,000, or less than one-half. The deaths were ascribed to the following causes: Puerperal fever 27.79 per cent; Accidents of pregnancy 24.28 per cent; Albuminuria and convulsions 19.97 per cent; Accidents of labor 18.08 per cent; and Puerperal hemorrhage 6.85 per cent.

While the rate for some of the Eastern medical centers was found to be somewhat lower than the average, the total urban death-rate was found to be considerably higher than that for the rural districts. This difference was due almost altogether to an increase in the number of deaths resulting from septicemia, albuminuria and convulsions. The mortality among negroes is higher than among whites, it being higher in towns and cities in both instances. It is rather striking to note to what extent the maternal mortality increases with the age of the mother. The percentage of stillbirths is the same in city and country, however, it varies greatly for different places (from about  $3\frac{1}{2}$  to 7 per cent) and is about twice as great in negroes as among whites. R. E. WOBUS.

**Robinson: Prenatal Death.** *Edinburgh Medical Journal*, 1921, xxvi, 137.

This article, a Sir John Struther Lecture delivered before the College of Surgeons of Edinburgh, establishes the fact that in some mammals the prenatal death of extruded ova, and of some of the zygotes formed from them, is of frequent and quite regular occurrence in perfectly healthy animals under ordinary conditions. Under these conditions such an occurrence must be then considered as normal. Therefore, Robinson feels justified in speaking of a "normal prenatal death rate." This is important in view of the fact that obstetricians, as a rule, consider prenatal death as due chiefly, if not entirely, to disease. If in most mammals, then probably also in men, in a definite, though not yet known, percentage of cases the embryo and not the mother is at fault. Inability of the gametes of certain individuals to unite and the production of abnormal zygotes after union,—both occurrences being not dependent on disease or abnormal environment—prove: (1) that some sterility is normal and unavoidable; (2) that a considerable amount of prenatal death is normal or usual, and, under ordinary conditions cannot be avoided; (3) that a considerable number of abortions are not only normal but necessary, for they are adapted to prevent a diminution of the birth rate; and (4) that the condition of the uterine mucosa associated with normal abortions is not diseased and that any treatment of it is not only unnecessary but probably also will be detrimental.

Unfortunately we have no knowledge and no means of ascertaining what the human "normal prenatal death rate" is, but this figure would have to be subtracted from the percentage figures calculated in the customary manner from registration reports, to arrive at the accurate figure of prenatal death due to disease.

HUGO EHRENFEST.

**Baughman: Statistics from 2341 Clinical Cases of Obstetrics.** Virginia Medical Monthly, 1921, xlvii, 495.

The statistics on which this paper is based are obtained from the outside obstetrical service of the Medical College of Virginia, covering the period from 1910 to 1920. The maternal mortality was .81 per cent, but if 7 medical deaths are excluded the percentage is reduced to .51. The obstetrical deaths—12 in number—were due to the following causes: eclampsia 7, ruptured uterus 2, sepsis 2, and embolus 1. Ten and a half per cent of the babies were stillborn.

JOHN W. HARRIS.

**Porter: A Retrospect of Four Thousand Obstetric Cases.** South African Medical Record, 1920, xviii, 471.

In a series of 4000 cases the author had 4 maternal deaths, 3 from eclampsia and 1 from acute hepatitis. There was not one case of puerperal septicemia. In 40 per cent of normal deliveries lacerations of greater or less degree occurred. With a forceps rate of 13 per cent in one series the laceration rate was 35 per cent. In another series with a forceps rate of 22 per cent there was a laceration rate of 15 per cent. In a later series, the forceps rate being 30 per cent, the laceration rate fell to 10 per cent. He attributes the diminution in the percentage of lacerations to (1) earlier delivery before the parts have lost their normal elasticity, and become edematous and friable from pressure, (2) the proper use of axis traction. The application handles of the forceps should not be pulled forward, the head should be allowed to carry them into that direction. This must be done to avoid any extension of the head. He does not remove the forceps before delivering the head. In no forceps case did the tear extend through the sphincter.

*Repair of perineum ruptured into the rectum.*—Success depends upon three factors: (1) Management of the bowels. (2) Use of as few sutures as possible; (3) Use of only sufficient tension to secure hemostasis. The operation should be performed in from 12 to 36 hours after confinement and after thorough evacuation of the bowels. He places a small tube in the rectum for from 12 to 24 hours and gives 2 or 3 drachms of oil on alternate days following the operation.

*Management of occipito-posterior cases.*—The author recommends that the head should be rotated manually to anterior position, if natural power fails to do so within an hour. If necessary one may use forceps for rotating instead of the hand.

*Breech cases in primipara.*—He believes in performing external version at the 8th month as a routine. This should be done under anesthesia if necessary.

*Prolonged first stage.*—These cases can be divided into 4 groups: (1) With feeble, infrequent pains, slow dilatation, very little suffering, rather tired patient. For these cases he advises the use of chloroform for 20 to 30 minutes plus a hypodermic of  $\frac{1}{6}$  of morphine; (2) Premature rupture of the membranes, regular pains, little dilatation, and no progress.



He divides these cases into two subdivisions: (a) when the presenting part does not come down, he uses a bag or manual dilatation, (b) when the presenting part comes down but the os does not dilate, he prefers chloroform for 20 or 30 minutes; (3) Unruptured membranes, os undilated, incessant pain with intense suffering, not infrequently some malpresentation, shoulder or breech. Chloroform anesthesia acts well in these cases; (4) Similar to group 3, but where no treatment is of any avail. It is impossible to dilate the cervix manually, it remains rigid. These cases are not common. He thinks pituitary extract might be tried in  $\frac{1}{2}$  c.c. doses.

*Postpartum hemorrhage.*—Porter had very little experience with these cases. He believes in introducing the hand or two fingers into the uterus and evacuating the uterine cavity thoroughly, after which he compresses the corpus bimanually.

*Adherent placenta.*—There were two cases in the series, one totally adherent, the other representing only retention of the membranes. The membranes should be left alone unless protruding or there is hemorrhage.

*Puerperal pyrexia.*—The author observed that the pulse rate was higher in the morning, the temperature higher at night. He considers a gradually increasing pulse rate as of grave significance even with moderate pyrexia and advocates early emptying of the uterus in these cases under anesthesia, if necessary, using two fingers, followed by intra-uterine irrigation.

F. L. ADAIR.

**Ballantyne: The Maternity Hospital, With Its Antenatal and Prenatal Departments.** British Medical Journal: 1921, No. 3137, 221.

The author believes that an antenatal clinic, prematernity ward, maternity ward, and neonatal ward are absolute essential parts of every maternity hospital. Gynecologic and pathologic departments are useful and necessary accessories but not absolute requirements. The maternity hospital of the 19th century limited itself to the care of women in labor and the care of the mothers and their babies during the puerperium. It led to many failures because of neglected and unnoticed abnormal conditions existing prior to entrance to the hospital. In the early part of the 20th century the idea of the hospitalization of pregnant women developed.

The importance of maternal welfare as an accompaniment of child-welfare is gradually becoming recognized. The falling birth rate in the havoc of the war and the emphasis on preventive medicine have given impetus to this work. The concrete fact was the establishment of antenatal clinics and prematernity wards in association with the maternity hospital. In the Edinburgh Hospital a bed for the care of diseases of pregnancy was endowed in 1901. This was soon increased to a ward with four beds to which the name "prematernity ward" was given. In Glasgow, antenatal dispensaries and an antenatal ward were opened in the Glasgow Royal Maternity Hospital between 1916 and 1918. The author gives credit to Boston for the establishment of "prenatal" nurses. He also speaks of the implantation of American ideas of maternal and child welfare in France by Americans during the war. With reference to the maternity hospital of the future, the author speaks of a well established, thoroughly organized antenatal department, together with maternal department and neonatal department. It is unnecessary to emphasize the importance of proper care

of the newborn during the month following birth. He states that the neonatal death rate is about 40 per 1000 live births and the first year death rate about 100 per 1000 live births. Stillbirths added to the neonatal death rate give a total of about 80 per 1000 births. All cases of neonatal deaths and stillbirths should be carefully investigated by an expert in antenatal and neonatal pathology. The neonatal ward should be furnished with incubators and other means of preserving life and should be under the management of skilled attendants. Special provision should be made for the care of syphilitic babies and those suffering from ophthalmia neonatorum. These conditions add to the responsibilities of hospitals. The modern maternity hospital should be a teaching center for both medical students and nurses.

Ballantyne states that it looks almost as if gynecology were on the point of breaking into two parts, the one dealing with those conditions due to or militating against childbirth, and the other dealing with diseases and tumors common to surgery and gynecology. For the former, he thinks provision should be made in conjunction with the maternity hospital. For the second subdivision, he sees no particular reason for close association with the maternity hospital.

F. L. ADAIR.

**Newell: Prenatal Supervision.** Southern Medical Journal, 1921, xiv, 155.

The author is of the opinion that never before in the history of the world has the vital importance of adequate prenatal care, together with conscientious obstetrics, been so generally realized as at the present time. The great number of women who die, or are permanently disabled from childbirth each year, and the vast number of stillbirths and high infant mortality, he believes, indicate two things: first, the lack of prenatal care, and secondly, incompetent management of labor and the newly born. Nine-tenths of all expectant mothers receive no prenatal care, and over forty per cent in the United States are attended in labor by midwives and physicians who are unqualified and incompetent to supervise the pregnant woman. The author believes this deplorable condition can be corrected by education of the laity to insist upon better obstetrical attention. He suggests the possibility of the government aiding or supervising the great work carried on by many societies in the larger cities, for instruction and prenatal care of expectant mothers.

In regard to midwives, government statistics have shown that the results obtained by them in some communities are not worse than the results of incompetent physicians doing obstetrical work.

NORMAN F. MILLER.

**Koster: The Value of Abdominal Exercises Before and After Delivery.** N. Y. Medical Journal, 1920, exii, 722.

The tone of the abdominal wall is an important factor in the mechanics of labor and in the maintenance of good health at all other times. A lax wall is usually found in multiparae, and is due to the overstretching of the muscles during a previous pregnancy beyond the limit of elastic recoil. Various types of anterior support give temporary relief but no permanent result because nothing has been done to strengthen the muscles which have lost their natural elasticity. Dur-

ing labor such an abdominal wall plays a negligible part in assisting the expulsive activity of the uterus; in many instances the relaxation encountered is so great that it allows of marked deviation of the uterus from the axis of expulsion.

The elastic tension of any muscle may be increased by exercise. Before maternity, therefore, the abdominal muscles should be prepared for the expected strain by raising their power through progressive exercise, increasing the elasticity beyond the amount of extension encountered in pregnancy. During labor, then, these muscles may furnish valuable aid to the expulsive efforts of the uterus. The following exercise is recommended by the author. With the patient lying on her back, the entire lower extremities from the hip down acting like a simple lever are flexed upon the abdomen to a line perpendicular to the resting surface and then lowered. The movement is repeated as many times as possible and the number increased with each succeeding trial with a concomitant improvement in the muscular tone.

MARGARET SCHULZE.

**Young: Some Points in Midwifery Practice.** British Medical Journal, 1920, No. 3129, 927.

Young emphasizes the proper and appropriate care of mothers (1) during pregnancy, telling them to lead a normal, active life avoiding shock, strain and fatigue. (2) During labor, he advises not meddlesome midwifery but intelligent interference. He advocates the rotation of the posterior occiput unless speedily accomplished by Nature. He is against application of forceps without first rotating the occiput and recommends the correction of face presentation at or above the brim by rectification or turning. In these cases it is preferable to use axis traction instead of ordinary forceps. He advises the use of calcium salts together with quinine and digitalis during the last month of gestation as a prophylactic for postpartum hemorrhage. (3) Proper aseptic care of patients is most important. Postpartum hemorrhages are always serious.

F. L. ADAIR.

**Ritter: Why Prenatal Care?** Journal of the Missouri State Medical Association, 1919, xvi, 359.

**Ferguson: A Plea for Better Obstetrics.** Canadian Medical Association Journal, 1920, x, 901.

**Gillespie: The Problem of Forceps Prehension in Obstetrics.** Ohio State Medical Journal, 1920, xvi, 578.

These three articles are good examples of timely propaganda for the improvement of obstetrical practice. Ritter estimates the number of uterine gestations in the United States at 2,650,000 per annum with 15,000 maternal deaths and calls attention to the fact that "no satisfactory measures have been instituted whereby the enormous loss of fetal life in consequence of expulsion of the product of conception before viability may be computed." Together 150,000 stillbirths and 115,000 neonatal deaths complete a known waste of life amounting to 280,000 in the performance of what should be a physiologic function.

The three authors put the onus of this loss of life on the teachers



and practitioners of obstetrics. Ritter emphasizes the necessity of adequate preliminary examination and routine prenatal care; Gillespie criticizes the fearless and careless application of forceps; while Ferguson forcibly calls attention to the inefficiency in the training and operative experience in the medical school curriculum coupled with "meddlesome midwifery" in practice.

Accurate statistics of the incidence of abortion have never been compiled in the United States. The mortality from postabortive sepsis is disguised wilfully or unwittingly on the death certificate. Despite the protests of obstetrical teachers that they have conscientiously taught proper prenatal examination and care and have written on the subject of obstetrical operative technic, eclampsia as yet cannot be classified as a preventable disease nor are birth injuries reduced in number except in a few of the well-conducted clinics in the larger centers of population.

Two methods for the improvement of this situation are suggested: first, more time in the undergraduate medical course devoted to practical obstetrics, or better, dividing the course in obstetrics into obligatory didactic courses for all students and elective practical courses for those students who may practice obstetrics; secondly, a special certificate to be issued by the Licensing Boards subject to review at stated intervals and required for the practice of obstetrics.

A. N. CREADICK.

**Rucker: Obstetrics De Luxe.** Virginia Medical Monthly, 1921, xlvii, 477.

The author discusses some of the more recent advances in obstetric practice, including prenatal care, morphin-scopolamin, nitrous oxide—oxygen, the work of Potter on podalic version, and that of Wright and Reed on the induction of labor at the end of pregnancy.

He reports a series of 50 cases in which he administered morphin-scopolamin and induced labor at an appointed time. Forty-six cases were delivered by podalic version, one by midforceps and three were delivered spontaneously before preparations for operation could be completed. One (macrated) child was stillborn, and one child died on the first day from an enlarged thymus. There were no infections in the mothers.

The best time for ending the pregnancy is determined by "careful history taking, accurate measurements and close observation of the patient in the last part of her pregnancy." Labor is induced by the introduction of a No. 4 or 5 Vorhees bag.

The author concludes that by the methods described "you can materially reduce the fetal mortality, lessen the likelihood of brain injuries and, at the same time, make child-bearing more comfortable for both the mother and obstetrician."

JOHN W. HARRIS.

**Buchanan: Midwifery Mechanics.** Indian Medical Gazette, 1920, lv, 321, 401.

Buchanan describes his methods of teaching to students the mechanism of labor by means of models, feeling that in this way the study can be made simple, easy and attractive. He considers the movements of the fetal head along three imaginary axes laying particular stress

on the "Pivot Points." One of these points is in the female pelvis at the pubic arch and the other in the fetus between the vertebral column and the head. His plates readily explain the normal as well as the abnormal mechanism. He brings out the fact that in our attempt to prevent rupture of the perineum we are endeavoring to get the two pivot points closely together.

Buchanan feels that in the manner suggested by him the teaching of obstetrics could be simplified, especially in regard to pelvic measurements, positions and presentations, hemorrhage, version and forceps. He offers in his two papers a possible solution of the present difficulties before medical teachers since there seems to be a desire to lengthen the course in order to give a broader scope of the subject. He endeavors to show that much might be done to make the subject of midwifery more easily and better understandable than the students have heretofore found it, emphasizing the value of models in this respect.

F. J. SOUBA.

**Herring: The Effect of Pregnancy Upon the Size and Weight of Some of the Organs of the Body.** *British Medical Journal*, 1920, No. 3128, 886.

The observations of the author are made on the female albino rat. He observed nine pairs of experimentals with their controls. His conclusions are as follows: In these experiments, pregnancy had little effect on the length or weight of the body, except that due to the uterus and its contents. The heart, kidneys, and spleen are little affected. The heart is not enlarged in pregnancy. The liver is greatly enlarged. The thymus undergoes rapid involution and is much diminished in size. There is slight hypertrophy of the suprarenals. The thyroids are diminished in size. The weight of the pituitary body is lessened, but histologic changes in its glandular lobe can be noticed.

F. L. ADAIR.

**Berlin Letter: Relation of Number of Males to Females Born Since the War.** *Journal American Medical Association*, 1921, lxxvi, 394.

The view is widespread that during a war and especially during the years following a war a great many more boys than girls are born. That the total number of boys born exceeds the total number of girls even under normal conditions is shown by the fact that in a series of 61 million births in Europe the relation of the sexes was 106.3 boys to 100 girls. In this connection it is peculiarly interesting to note that also in animals, constant sexual differences in the birth rate have been noted. In cattle, to 100 females there are 107.3 males; in pigs, 111.8 males; in pigeons, 115; in butterflies, 105 males. As to the relative birth rate during the war, statisticians have been endeavoring to determine just what actually did happen. Geheimrat Bela, formerly division superintendent in the Prussian bureau of statistics, on the basis of information furnished by the various statistical bureaus of Germany has reached the conclusion that there is no ground for the prevailing belief that in the births during the period from 1914 to 1917 there was an unusual preponderance of males over females. The relative proportion of the two sexes has not changed. In Prussia, during the years 1914-1917, the relation of males to females born was between 106 and 107 to 100.

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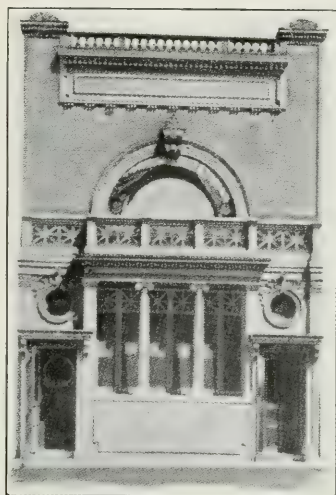
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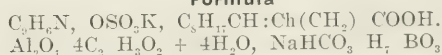
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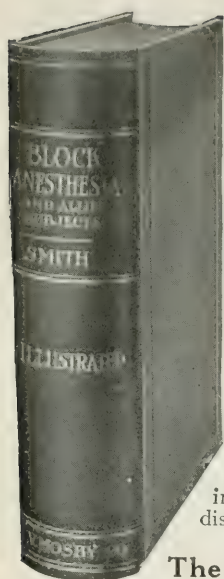
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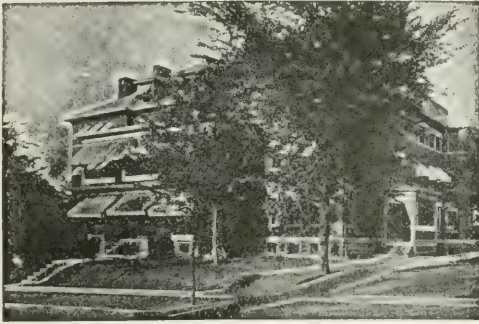
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